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Armour ENGINEER and Alumnus

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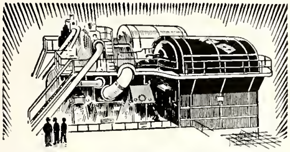
BREWERY GOODNESS SEALED RIGHT IN

G-E *Campus News*



BIGGER AND BETTER TURBINES

The new 110,000-kilowatt turbine-generator, built by General Electric and recently placed in service in the River Rouge plant of the Ford Motor Company, sets several new records in turbine construction.

It is the first large unit in the world to operate at 1200 pounds pressure and at 900 Fahrenheit. Although the weight is approximately 2,000,000 pounds, it is so compact that it occupies less than a cubic foot for each kilowatt of output. Because of its extremely high efficiency, less than a pound of coal is needed to generate a kilowatt-hour of electric energy.

The new turbine is a vertical compound machine with the high-pressure turbine and generator mounted directly above the low-pressure unit. Superheated steam enters the upper unit at 12 pounds and 900 degrees. After producing 55,000 kilowatts, the steam flows directly into the low-pressure unit where it produces another 55,000 kilowatts before it is exhausted to the condenser. This is the first 1200-pound turbine in which the steam enters the low-pressure stage without reheating.

The work of designing, constructing, testing, and installing great turbines, such as this, is the accomplishment of hundreds of graduates of technical colleges and universities—men who are also graduates of the G-E Test.

THERE'S MY FARM!

ELECTRIC HEAT FOR SOILLESS GARDENS

California nurserymen are growing tomatoes, strawberries, and sweet peas in chemically treated water heated by electricity. The method, developed by Dr. W. F. Gericke, of the University of California, has been extended to commercial installations. Tomato plants, grown in this way, produced unusually high-quality tomatoes. The yield was large, and they matured ahead of tomatoes grown in soil.

Nourishment for the plants is provided by special chemicals dissolved in the water. Because the water temperature must be accurately maintained, a controllable heat source is required, and General Electric engineers have supplied heating cable and thermostats both for the experimental installation and for commercial installations which have followed.

COFFIN FELLOWSHIPS

This fall eight young men will be carrying on advanced research in seven American universities under fellowship grants from the Charles A. Coffin Foundation. The recipients and their research problems:

George E. Boyd, U. of Chicago '33. At Chicago. Study of surface energies.

Lyman R. Fink, U. of California '33. At California. Phenomena in synchronous machines. Second grant of fellowship.

Alvin H. Howell, U. of Kansas '29. At M.I.T. Insulation problems in d-c transmission.

Russell A. Nielsen, Stanford '33. At Stanford. Electron mobilities.

Richard W. Porter, U. of Kansas '34. At Yale. Transients in the monocyclic network. Second grant.

Julian S. Schwinger, Columbia '36. At Columbia. Theoretical investigations in nuclear physics.

Chauncey Starr, R.P.I. '32. At Harvard. The pressure coefficient of thermal conductivity. Second grant.

Harold G. Vogt, U. of Buffalo '31. At Harvard. The nature of the neutron.

Since 1922, when the General Electric Company established the Charles A. Coffin Foundation in honor of the Company's first president, 113 fellowships have been awarded for advanced work in electricity, physics, and physical chemistry.

GENERAL ELECTRIC

LETTER ▪▪▪ ▪▪▪ BOX

From First Editor of Student Engineer

Buffalo, N. Y.,
77 Swan St.,
October 1, 1936.

Alumni Secy.:

Thank you for your letter of the 29th with respect to the ARMOUR ENGINEER AND ALUMNUS.

Coming the day after I had a most interesting breakfast meeting with Al Eustice, while he was in Buffalo attending a convention, your letter brought Armour very much into my mind again.

I hope some of these days to be stopping in on you when, perhaps, I can dig up something of interest for the ENGINEER. *By the way, I wonder if you recall that this publication was my humble creation in my last year at Armour?*

With kindest regards to Ernest Freeman and other good friends there.

Sincerely,

H. RALPH BADGER, E. E. '08.

Sachs Returns to Fold

1934 *Atwood Ave.,*
Madison, Wis.,
Sept. 4, 1936.

ENGINEER AND ALUMNUS:

I should appreciate very much to have my name placed on your mailing list, and particularly to be informed of any class reunions.

Should any of my esteemed profs. or fellow engineers and classmates be interested to learn how I have been faring during these years of depression, you may know that I have been employed with the Federal Government since I graduated, and for the past three years I have been gaging streams in Wisconsin for the U. S. Geological Survey, here in Madison.

Mrs. Sachs and I treated ourselves to a trip to Europe this summer. We visited France, Germany, Russia, and a few minor countries.

Sincerely,

M. S. SACHS, C. E. '30.

Flowers from Dave Smith

Lexington, Kentucky,
May 21, 1936.

Dear Editor:

I have just finished reading the May "Engineer" from "kiver to kiver" and I feel I must extend my congratulations upon such a splendid piece of work. The concise, clearly and interestingly written articles, the excellence of make-up, and the evident thought behind the editorial policy all go to make this achievement outstanding. In fact the publication was so darn good that a feeling of nostalgia crept over me as I turned the pages. . . .

With the kindest wishes for continued success, I will close now.

Yours,

DAVID T. SMITH, F. P. E. '30.

Morrison Moves Law Office

111 *West Monroe St.*
Chicago, Ill.

[Ed. note: A letter from Ben Morrison, C.E.'22, and notice of a change of address from City Hall Square to Harris Trust Bldg., have been received. Ben is another of those engineers who have been wooed away by the attractions of another profession.]

* * *

For the first few years I worked as designing engineer for the C.B.&Q. R.R. and for several architects in Chicago. Then I went to work for the City of Chicago and advanced to the position of Engineer of Contracts and Specifications. As City Expert on Municipal Ordinances for construction projects and Traction Ordinances, I became interested in law, to help me in my work, and after completing my course was admitted to the bar, in 1928. Enjoying the practice of law, I left the City service and opened up my own office to practice. My specialties are real estate, mechanics liens, and taxation, since alienation of affections suits were prohibited a year ago.

BENJAMIN F. MORRISON, C. E. '22.

BENJAMIN F. MORRISON

ANNOUNCES THE

REMOVAL OF HIS LAW OFFICE

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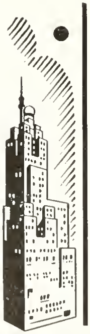

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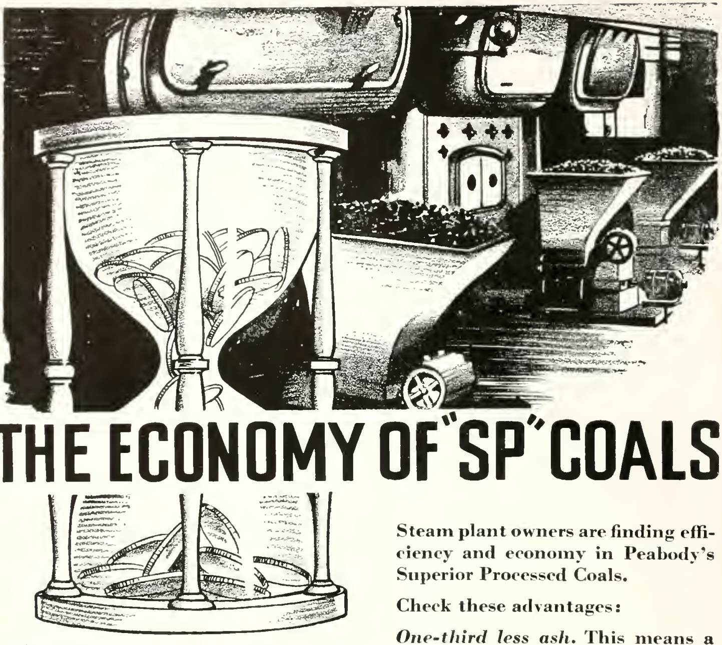

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ARMOUR ENGINEER and ALUMNUS

OCTOBER 1936
VOLUME 2 NUMBER 1

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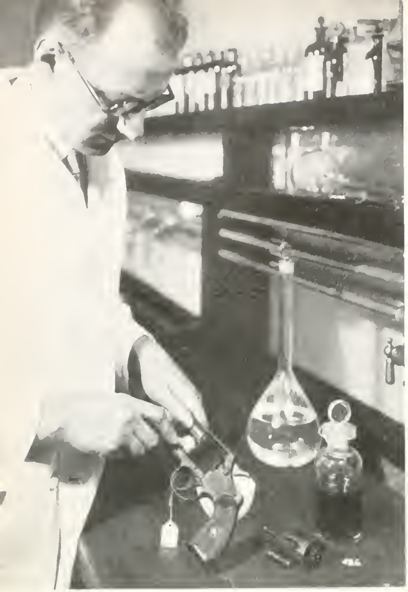


ENGINEERING CATCHES THE CROOK

C. W. Muehlberger, Ph.D.*
Cook County Coroner's Laboratory

Fig. 1—
Dr. Muehlberger applying etching reagent to restore the serial number of a revolver.

IN the late "nineties," Sherlock Holmes had remarkable success in tracking criminals by means of a technique which consisted largely of keen observation and deductive reasoning. But that was before the day of machine guns, tear gas, and oxy-acetylene torch, paved highways, speedy automobiles, aeroplanes, radio, and other inventions which gave added force to the criminal's hand or speed for his get-away. In order to cope with organized anti-social groups, who have been quick to employ new scientific discoveries in their nefarious work, law-enforcement agencies have been compelled to modernize their old-fashioned sleuthing procedures. First came the development of the Bertillon system of identification and the use of fingerprints; then the microscope, chemical analysis, medical sciences, and even radio communication served as aids in apprehending the criminal and discovering the evidence necessary to prove his guilt. The mute but eloquent web of circumstantial evidence developed by the use of modern investigational techniques has more than once served to spoil an otherwise "perfect" crime. As a matter of fact, perfect crimes nowadays exist only in the movies or in mystery story fiction. With these developments, it is not surprising to find among our most useful and significant methods the application of that part of applied science which we designate as "engineering."

The background for most of these engineering methods for criminal investigation is given by two more or less axiomatic principles: (a) If investigated exhaustively, no two things made by human hands are *exactly* alike, and (b) Forceful or violent contact of a hard substance against a softer one may leave on the latter unmistakeable traces of peculiarities of the hard surface. There will probably be a general acceptance of the first of these without offer of proof. The second principle is only of importance insofar as it permits one to identify marks which are characteristic of a *specific* hard surface and which enable one to state with certainty that these traces must necessarily have been made by that particular surface and no other.

One of the most spectacular engineering applications in criminal investigation has been in the identification of fired bullets as having been fired by a particular gun. If the bullets in evidence are not too badly distorted by their impact against extremely hard or resistant material, they may bear the characteristic imprints or "fingerprints" of the rifling grooves of the gun barrel through which they were fired.

Like any other steel cutter, the tool used in rifling a steel gun barrel has a cutting edge which is uneven and irregular. To the naked eye, the tool may seem to have a smooth sharp cutting edge; but if examined closely, the edge will be found to be irregular and serrated. Even the edge of a carefully honed razor shows such irregularities if examined by means of a microscope. These irregularities in the tempered cutting edge of the rifling tool leave their imprint in the helical rifling grooves which are cut into the inside surface of the soft steel gun barrel. The steel of which the cutting tool is made is never perfect in hardness nor in homogeneity. As a result, the cutting edge wears down slightly during the rifling operation and its microscopic irregularities change. Thus, no two rifling grooves of a gun, even though cut with the same cutting tool, have the identical microscopic pattern.

---

*Class of 1920 (Chem. Eng.).

Bullets of lead or jacketed with cupro-nickel alloy, when forced through a rifled gun barrel by the propellant force of burning gunpowder, expand slightly so that the bullet spreads into the rifling grooves of the gun barrel and cause the bullets to take on a rotational velocity as well as a forward motion. It is this spinning movement which causes the bullet to travel true to its mark; without this rotational movement, the projectile would take a course which is as erratic and impredictable as was the "spitball" used by pitchers in the earlier days of baseball. As the bullet passes through the gun barrel, its softer metal takes the imprint of the rifling grooves so that we have on the bullet what might fairly be called the "fingerprint" of certain rifling grooves.

If we later discover a gun which is suspected of having fired the evidence bullet, we may compare the "fingerprints" of its barrel with the prints on the evidence bullet. The characteristics of the gun barrel are obtained by firing a test shot into some soft material such as cotton waste, oil-soaked sawdust, or a large tank of water. These will stop the fired bullet without damaging the imprints left by the rifling grooves. If the gun which fired the evidence bullet was of the same caliber, type, and manufacture, we would expect the evidence and test bullets to have the same size and to show the same number of rifling groove marks of about the same width and pitch of twist. By a casual inspection of the evidence bullet, a firearms expert may frequently tell the kind of gun from which it was fired. Colt revolvers have six rifling grooves with a left hand twist, Smith and Wesson revolvers have five rifling grooves with a right hand twist, and Thompson sub-machine guns have six grooves with right hand twists. Each gun manufacturer has his own ideas as to the proper number, width, pitch, and direction of twist of rifling grooves—and fortunately—no two of them agree exactly.

In comparing an evidence bullet with a test bullet fired from a suspect's gun, one may find certain points of similarity in the rifling groove markings. But it is only where these points of similarity are so frequent that they could not possibly be attributed to chance, can one say that two such bullets have unmistakable indications of the same rifling groove and therefore must have issued from the same gun barrel. And if one pair of grooves match, it is only fair to ascertain whether or not the other grooves of these two bullets also match. By such a comparison of the traces left on bullets by the irregularities in the surface of rifling grooves, one may be able to say positively that a fatal bullet taken from the body of a murdered man was fired from the suspect's gun and *from no other gun!*

Not only are rifling grooves different and characteristic, but also the breech faces of revolvers and pistols have marks of machine operations which may serve to identify them. (Fig. 2.) Frequently the breech face is finished off by a grinding operation which leaves very fine marks of the abrasive. When a cartridge is fired

(Turn to page 21)

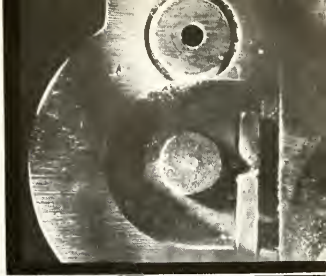


Fig. 2—

Breech face of revolver showing fine scratches left by the finishing operations.

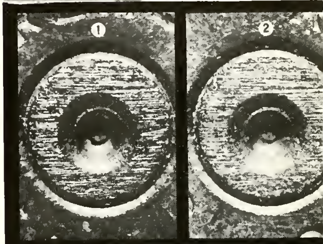


Fig. 3—

Breech face imprints of the same automatic pistol on copper percussion caps.

No. 1—Cartridge case fired from suspect's gun.

No. 2—Cartridge case found at scene of shooting.

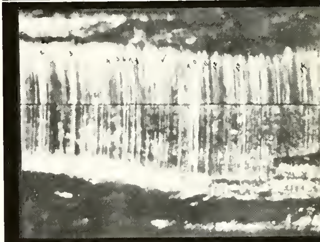


Fig. 4—

Marks left by cutting jaws of a bolt cutter.

Top on test rods of soft steel.

Bottom on padlock of burglarized warehouse.

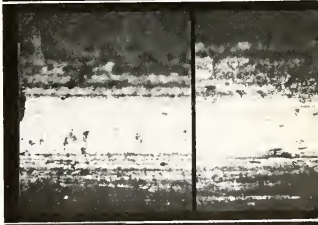


Fig. 5—

Markings left by final die in drawing 12 gauge copper-clad steel wire.

Left—Wire from time-switch of bomb.

Right—Wire left in suspect's shop.

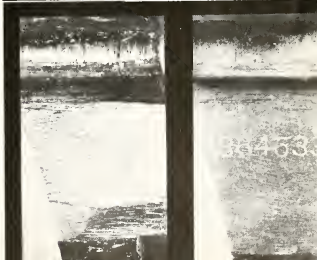


Fig. 6—

Enlarged photograph of gun frame—before and after applying etching reagent to restore serial number.

STEEL

The electric furnace makes possible modern alloy steel. Pouring a heat of stainless steel.

AT a recent gay costume ball given at a suburban country club in the East, first prize for the most original and most humorous costumes was awarded to a young couple who appeared in their parents' clothes of 1900. Resurrected from the attic, the girl's dashing shirtwaist and flowing skirt and the young man's trim bowler and startling checked vest were the talk of the evening. Attire absolutely correct and fashionable in 1900 is now cause for hearty laughter. Times have changed; and the fashion plates who strolled "Peacock Alley" in its heyday would now be objects of ridicule at the Waldorf, the Copley-Plaza, or the Drake.

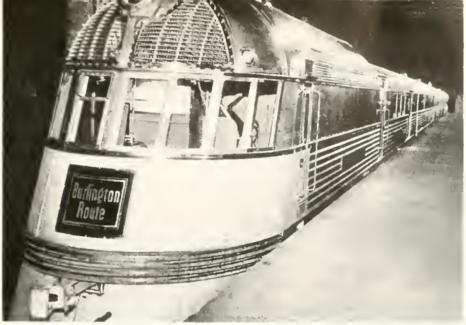
So it is with steel. If one should review the steel industry and follow the stages of advancement through which it has passed in the past three and a half decades, he would find that steels have changed just as clothes. The modern trend in metal construction has completely outmoded what was once considered the best practice. When industry issues demands for superior grades of materials, research engineers in their laboratories attempt to meet these pleas by adding certain elements to steel. Thus has grown the multitude of alloy steels that are daily becoming more widely used.

Just as the housewife experiments with her cooking, so the metallurgist tests batches of molten metal. Chromium added to his mixture will give him certain desirable characteristics. Chromium and nickel in the proper quantities make steel rustless and stainless. Still other proportions of the same materials impart strength and resistance to wear. Toughness, strength at high temperatures, and resistance to corrosion, shock, and fatigue are other desirable features that the metallurgist imparts to steel by a proper choice of the materials he adds.

In 1900, "steel" usually meant ordinary carbon steel composed mainly of iron, carbon, and a few impurities. In 1936, "steel" is very apt to mean an alloy of steel with any of a number of elements such as chromium, manganese, silicon, tungsten, molybdenum, nickel, or vanadium held within a strict range of percentages. Wherever a special application is involved, investigation will probably show that some form of alloy steel is used or can be used to advantage.

The date of the first important commercial use of alloying materials in steel or iron can be set very nearly at 1882. In that year, Sir Robert Hadfield of Sheffield, England made a steel containing approximately t2

—in 1936



The stainless steel streamliner "Mark Twain"—the first train to top the speed records set before 1905.

by Robert K. Kennedy

of the Electro-Metallurgical Company.

per cent manganese. Its properties were astounding! Actually, the more the metal was abused in service, the harder and tougher it became.

When first put into use, Hadfield's steel is no harder than ordinary steel. However, under severe punishment, as for instance, at railroad crossings, where it is pounded by heavy, fast-moving trains, the frequent blows and shocks toughen and harden the steel so that it lasts many times longer than ordinary steel. Although this property made the metal difficult at first to cut and machine, methods, machines, and tool materials for shaping, cutting, and turning metals have improved so much that Hadfield's original steel is now extensively used wherever a material is required to stand up for extended periods of time under battering service.

Strangely enough, after this first glimpse of what the future held in store, progress in steel alloys remained practically at a standstill until 1900. Then at the beginning of the twentieth century, the curve again shot suddenly upward. Prompting this spurt was a general metallurgical search for more effective armor plate for battleships—a material that would be harder, tougher, and better able to withstand the terrific punishment which it would receive in service. After much painstaking research, the correct percentage of chromium and nickel were added to steel to give the desired results.

Again, fourteen years later, the World War furnished an impetus which set the entire steel industry humming into greater activity and production than ever before. Shipyards and munitions plants immediately began to cry for better quality steel. To meet this demand, the research engineers rolled up their sleeves, heated up their crucibles and furnaces, and called upon all the resources at their command. The results of their work were amazing. Elements that had previously been considered laboratory curiosities became commercially prominent overnight. The producers of ordnance steel, by demanding properties in metals that were previously considered impossible to obtain, caused the launching of an industry that was destined to attain gigantic proportions. From the midst of this furore, alloy steel—steel containing amounts of the lesser known elements ranging from 1/500th to almost ½ of the finished metal—emerged as the answer to a majority of the newlyfelt needs.

Born of and nursed by war time necessities, the alloy steel industry is passing through youth and approaching maturity by expanding into practically every industrial field. In addition to replacing ordinary steel in many established applications, alloy steels are even superseding wood, stone, and concrete in some of their common uses.

Probably the most outstanding example of the development in alloy steels is the use of the well-known stainless steel, which contains 18 per cent chromium and 8 per cent nickel, in building construction. The exterior and interior trim of this metal on the Empire State Building and the Chrysler Tower in New York City marked the beginning of an entirely new mode in structural design. In both exterior and interior trim, as well as

Manganese steel, a pioneer of alloy steels is used whenever abrasion is encountered. The dipper bucket is completely fabricated of this material.

in store fronts, stainless steel lends itself readily to the development of artistic designs which assure enduring beauty with a minimum of maintenance. In store interiors, stainless steel fittings and equipment promote a bright and cheerful atmosphere of spotless cleanliness. Because of the permanence and beauty of this shiny metal, a large percentage of building modernization plans are making use of it, and every architect is learning to think in terms of stainless steel when planning the design of modern buildings.

Furniture, too, is now being made in increasing quantities of this sturdy material. With stainless steel furniture, the hostess entertaining on the veranda or lawn of her country residence is freed from the worry that a sudden shower may ruin the furniture while guests scurry for shelter. Chairs, and tables too, of stainless steel will withstand equally well the rigors of outdoor life.

In addition to decorative purposes in the structural field, stainless steels are used where both strength and rust resistance are necessary characteristics.

The world's largest power turbine at Boulder Dam employs blades and other parts of high strength alloy steels. Nearly 2500 tons of stainless steel helped in the renovation of the ancient one and one-half mile long Assouan Dam in Egypt. In addition, all of the newest bridges make use of a steel containing small amounts of the alloying metals, silicon and manganese, or nickel for highly stressed members.

At the other end of the scale, even pen points have developed from the quill stage to the use of stainless steel.

The new fashions in railroad design reflect an extensive use of alloy steels. Four or five years ago, locomotives employed considerable amounts of these versatile materials, but only limited amounts were used in car construction, and here, still, little thought had been given to weight reduction. Today, schedules have been greatly speeded up, costs per mile effectively reduced, and railway transportation has been made much more colorful and attractive by the introduction of the lightweight stainless steel "streamliners."

Today, almost every major railroad in the United States has a high speed "flyer" which clips many minutes from the time of each trip. The long established records, remarkable in their day, set by jaunty steam locomotives during the nineties and early 1900's have finally been topped. The motorman of the new Burlington diesel train "Mark Twain" was undoubtedly many times more comfortable travelling at 122 miles per hour last fall than was the two-fisted engineer of the Empire State Express in 1893, storming down the New York Central main line near Crittenden, New York, at 112.5 miles per hour.

Since 1934, streamlined, lightweight cars and locomotives, electric engines, and diesel or diesel-electric locomotives have speeded up railroad schedules on important lines both here and abroad. Improved design and appointments, and a wide use of alloy steels throughout the new trains has helped greatly to make railroad travel more attractive to passengers. Stainless steel, with a strength of almost three times that of ordinary steel, has made it possible for three car articulated trains, power plant and all, to be made weighing only slightly more than a regular standard Pullman car. In view of this fact, it is not hard to understand how much less expensive it is to operate the new units from the standpoint of fuel consumption and track maintenance. Safety, too, is embodied in the powerful, rigid alloy steel structures of these trains.

However, those are not the only advantages to be gained. The new fast "streamliners" have become flying silver advertisements for their respective railroads. Repainting and refinishing exteriors is a thing of the past. The new trains retain their gleaming newness indefinitely.

In industry, alloy steels are vital to the success of many processes. For instance, in chemical plants, ordinary steel vats containing one of the common corrosive acids would disintegrate in almost less time than it takes to tell about it. In the same manner, so would the piping which conveys the acid. Naturally, no one metal will prove a panacea for all chemical corrosion, but several types of acid-resisting alloys are being tested and marketed, each individual class being designed to be practically unaffected by certain acids, bases, or salts. Under certain conditions chromium and chromium-nickel stainless steels and irons are performing the double duty of resisting acid solutions and furnishing strength and toughness at the same time. These alloys are used most extensively for pumps, pipes, and valves.

Automobile, truck, and bus manufacturers consume a major percentage of the alloy steels produced today. Decorative trim, interior fittings, and many parts of the running gear are composed of alloyed materials. In the engine, the prime factors determining the selection of materials are, in some cases, great surface hardness and resistance to wear; in others, machinability and ease of production; while in still other instances, resistance to heat, great strength or toughness is the paramount requisite.

It has been stated that the difference in weight due to wear, disregarding tires, between two cars of the same year, make, and model, the one just off the production line, and the other used to a point where it is ready for the scrap heap, is less than 5 lb. Only 5 lb. worn off a ton and a half —yet the value of the old car may be only $25 as against $700 when it was new! Naturally, to prevent this wear and the subsequent staggering depreciation, special materials are employed at strategic points in the car's mechanism. Much of this wear is confined to cylinder walls, gears, bearing surfaces, and valves, and so, of course, these are the logical parts to be composed of alloy materials. Thus metallurgical progress has decreed chromium-nickel steel, or alloy cast iron cylinder liners, chromium - vanadium or chromium-molybdenum steel gears , special alloy bearings, chromium-silicon steel valves, and alloy steel and iron crankshafts. More and more parts of cars, which really require alloy steels to a much less degree than those mentioned above, are gradually being fabricated of these materials. Some day, when fenders are entirely made of rust resisting steel, the once familiar sight of the ancient relic clattering down the street with its perforated mud guards waving in the breeze will be only a memory.

According to the American Iron and Steel Institute, the average useful service of the steel used in this country is now more than twice as long as it was 50 years ago. The 34,000,000 tons of steel produced last year may be expected to last an average of 32 years. In contrast, the output in 1885 of less than 2,000,000 tons probably served an average of about 15 years. All important in this steadily increasing life of steel is the ever widening use of alloying metals.

The greatest friend of truth is time; her greatest enemy is prejudice.

—Colton.

If I cannot do great things, I can do small things in a great way.

—James Freeman Clarke.

Determine that the thing CAN and SHALL BE DONE and then we shall FIND THE WAY.

—Lincoln.

PROGRESS

During the Past Year

by Willard E. Hotchkiss, Ph. D.
President of Armour Institute of Technology

EVENTS of the past year that merit particular notice include, in summary, establishment of the Research Foundation, inauguration of the Cooperative Course in Mechanical Engineering, articulating the Department of Architecture with the profession through an advisory committee of distinguished architects, reducing teaching loads, and otherwise improving conditions for the faculty, increase in enrollment with notable expansion of graduate work and almost phenomenal evening registration, and finally, substantial betterments in buildings, grounds, and equipment. These changes were covered in some detail in the President's annual report to the Board of Trustees, which is available in printed form. Material for this article is drawn largely from that report.

By far the most significant event of the year was the establishment of the Research Foundation. More and more scientific research has come to be of the very essence, not only of industrial progress but of industrial security. Scientific discoveries and inventions made available through the medium of technology are constantly creating new worlds. To maintain for Armour a worthy and important place in these creations is the firm purpose of those responsible for Armour policies.

The proposal to establish a Research Foundation was officially launched at a meeting of the Board of Trustees in May, 1935. The idea matured during the year, and many conferences were held with representatives of research laboratories, foundations, and schools of engineering distinguished for their research activities.

In December, 1935, the Universal Oil Products Company, through the intercession of Mr. John J. Mitchell of the Board of Trustees, provided a research fellowship at the Institute, to which Dr. Vasili Komarewsky was appointed. After a distinguished career abroad, Dr. Komarewsky had served since 1931 as research chemist for the Universal Oil Products Company and lecturer at Northwestern University.

The final impetus which made the Research Foundation a reality was an offer from Mr. Stuyvesant Peabody of the Board of Trustees to underwrite for one year a project for studying Illinois-Indiana coals. The magnitude of this project made it desirable to start the Foundation at once. Accordingly, on April 3, 1936, the Board of Trustees authorized its incorporation. The Foundation will be occupied both with research for industry and with basic independent research.

The coal study just mentioned was started on July 1, 1936, with Dr. Robert D. Snow in charge. Dr. Snow came to Armour from the Research laboratories of Phillips Petroleum Company. He was formerly with the Engineering Experiment Station of the University of Illinois, and before that had served as research chemist for the Mid-Continent Petroleum Corporation and for General Motors Research Laboratories.

Dr. William A. Pearl of the Department of Mechanical Engineering, in charge of shops, has been conducting research in mechanical stokers for the Whiting Corporation, of which General Thomas S. Hammond of the Board of Trustees is President, since April of this year, and arrangements have now been made for making this work continuous. The Whiting Corporation is also financing a research project in chemical filtration. Dr. O. A. Hougen of the University of Wisconsin will join the Institute staff as a professor of Chemical Engineering in the second semester of this year, and will be in charge of this project. Dr. Hougen was formerly coordinator of research in silk for the United States Testing Laboratories, and is known for his investigations in the field of heat flow.

Alumni who are unaware of the magnitude of research activities carried on at Armour throughout the years will be interested in some of the contributions to scientific and engineering advance for which credit belongs to members of the Armour faculty. Armour is reputed to be the first school to offer advanced courses in airplane design. One of the earliest radio messages ever transmitted originated on the Armour campus. For almost a generation, Armour played a leading role in advancing the engineering of power plants. Instruments and methods in almost universal use for measuring heat flow through building materials were invented at Armour. The automotive laboratory has for many years done notable research in the field of internal combustion engines and the performance of motor fuels and many other phases of automotive engineering. Many chemical processes had their origin in the Armour laboratories. Difficult problems in acoustics of buildings have been solved. A member of the Institute staff assisted in the early development of the Mercury tractor and the "trackless train" used in handling freight and commodities at the Union Stock Yards. The Department of Sanitary Engineering has developed and constructed, with the aid of research students, an experimental water treatment plant, which is a complete operating unit adapted for research. An important study of the characteristics of wire rope as electrical conductors has recently been completed.

The above list of achievements, of course, does not include the research of Armour alumni who are not members of the faculty. Many alumni are perhaps not aware that the Institute Board of Trustees has several alumni members, each of whom has made distinguished contributions to research. One is Vice President of the Peoples Gas Light and Coke Company, in charge of research; a second was the inventor of the Teletype and, with another trustee, is actively engaged in producing it; a third was the first successful producer of malt sugar, and is responsible for the success of the company utilizing it; a fourth has built up an excellent business based on his own inventions in the field of electric circuit protection. Of the long list of other alumni who have achieved notable results in research, space permits mention of only one, but it should be noted that a holder of three Armour degrees has won outstanding distinction in the higher reaches of both engineering and pure science at Mount Wilson Observatory.

Publicity attending the setting up of the Research Foundation has brought about numerous conferences with business executives in reference to further new projects, some half dozen of which appear likely to get under way in the near future. Organization of the Foundation and its extension to cover all of the research activities on the campus was not completed until September 1, 1936, when Dr. Thomas C. Poulter was installed as Executive Director.

Dr. Poulter was senior scientist and second in command of the Byrd Antarctic Expedition II, and is one of the leading scientists of the country in electrical, chemical, physical, and optical effects of extremely high pressure. He has also done notable work in organic chemistry, geophysics, seismology, terrestrial magnetism, and other fields. He has the enthusiastic sponsorship of eminent physicists and chemists of the country, and was highly endorsed by men responsible for research in several leading industrial corporations. Admiral Byrd notes that Dr. Poulter deserves the full credit for the scientific work of the Second Antarctic Expedition, and that he was largely responsible for the success of much of the promotional and organizing work.

Cooperation with industry during the last year has not been confined to research. On the initiative of General Hammond of the Board of Trustees, whose activity with the Research Foundation has been noted, a new Cooperative Course in Mechanical Engineering was inaugurated in February, 1936, and eighty men were enrolled. Students in this course spend twenty-six weeks each year in industry and twenty-four in school, in alternating periods of about eight weeks. Under this plan, regular requirements for the Bachelor's degree can be completed in five calendar years. The forty positions held alternately by the eighty students represent some thirty of the most important industries of the Chicago area. Another group of one hundred students, placed in fifty positions, will start the course in February, 1937, and it is gratifying to note that positions are already available for them. The men in this course are carefully selected from the standpoint of scholarship, physique, personality, and general promise of success in an engineering career. As result of starting the undergraduate cooperative course, a proposal has been made for a graduate Cooperative Course in Electrical Engineering. It is quite likely that such a course will be undertaken in the near future.

A well known alumni member of the Executive Committee, Mr. Alfred L. Eustice, has suggested the inauguration of a special course for executives in the field of Maintenance Engineering. Mr. Eustice is cooperating with members of the staff in getting this course under way, and it is expected to begin in January, 1937. The course will be in charge of Henry P. Dutton, Professor of Industrial Management and Chairman of the Department of Social Sciences. Meetings will be held at dinner at a downtown hotel, and the lectures, for the most part, will be given by prominent executives.

Space does not permit extended reference to the phenomenal expansion of the evening school which has occurred during this year, but mention should be made of two significant facts in connection with that expansion. The first of these is the important place that graduate study now occupies in the evening program. Through the effective work of the administrative Committee on Graduate Study, of which Professor Benjamin B. Freud is chairman, and the cordial cooperation of members of the faculty, a comprehensive program of evening graduate study is now offered in practically all of the engineering options, and many evening students are working for advanced degrees. The other outstanding and encouraging fact in reference to the evening school is the number of students who are availing themselves of the program of regular college work offered in the evening. If a student is willing to spread his college course over a long enough period, it is now practicable to complete the first two years of the college course in evening classes, and it is entirely feasible, without too prolonged delay, so to complete the first year.

Naturally, such an expansion of educational and research activity as has just been outlined implies corresponding development of equipment and personnel. The Institute budget of the present year not only provides for handling the Cooperative Course, an enlarged evening school, and increased registration in some of the undergraduate options, as well as an expanding program of graduate study, but it has undertaken to establish improved conditions for members of the faculty. As result of depression and emergency conditions, members of the faculty in recent years have been carrying excessive teaching loads. Readjustment of schedules and additions to the staff have partially corrected this and have released much faculty time and energy for research and other activities that will make for constant raising of standards. Supplementing the Institute budget, the budget of the Research Foundation allocates from $20,000 to $25,000 for salaries, a large part of which goes to members of the faculty whose duties in whole or in part consist of work for the Foundation. These measures constitute a significant enrichment of the whole Institute program.

It has also been necessary to provide additional space and equipment during the year. A committee of the Board of Trustees, consisting of Messrs. Alschuler and Farr, was appointed to cooperate with Professor Vagtborg, Superintendent of Buildings and Grounds, in plans for meeting the growing educational and research requirements. Under the program worked out by this committee, the chemical laboratory and the first floor of Chapin Hall have been remodeled so as to provide more and better classrooms. Arrangements have also been made for meeting later requirements as they become manifest. All of this has been handled without prejudice to long-time policy in respect to a future site and plant.

Although the necessity, and therefore the wisdom, of making changes in our present plant to provide for current business and for the development program is beyond question, the need for a better plant suitably located is as urgent as ever. Numerous conferences have taken place during the past year directed toward securing a plant adapted to our requirements together with enough en-

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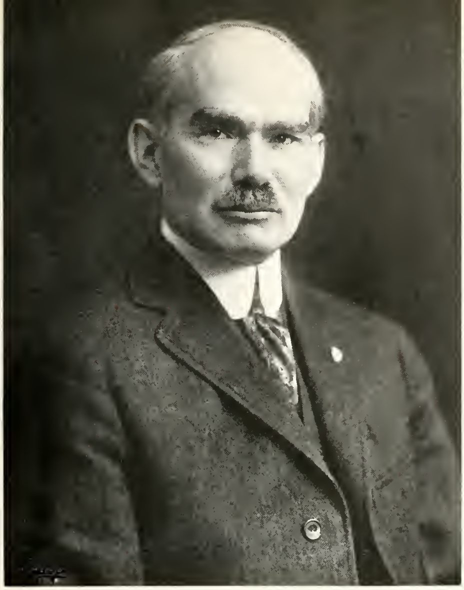

A Letter from Lee De Forest

Father of radio broadcasting and receiving

Los Angeles, California.
October 7, 1936.

Armour Engineer & Alumnus:

The facts of my early work in Chicago are briefly these:

I left the telegraph laboratory of the Western Electric Company in May, 1900, to take a position as engineer and experimenter for the American Wireless Telegraph Company in Milwaukee. There, work for me continued only a few months, and I returned to Chicago as Assistant Editor for the *Western Electrician.*

Shortly thereafter I resigned this work to devote my entire time to my experiments in wireless. I moved down to the "Armour Flats" so as to be near the Institute, having previously arranged with Prof. Clarence Freeman of the Electrical Department to have the use of his laboratories for carrying on my experimental work. In return I was to assist him in his laboratory class work. About this time I obtained a position teaching mathematics in the night school of Lewis Institute for the magnificent salary of $5.00 a week. This income, however, was doubled through the generosity of Edwin Smythe, who was taking a keen personal interest in my wireless experiments.

I carried on this work at the Institute from September or October, 1900, to July, 1901. During this period I so far perfected the electrolytic detector to a point where I could actually receive telegraphic code signals over "distances."

I remember that I was quite pleased when I was able to receive signals from my spark coil practically the entire length of the upper hall in the Institute! Enboldened by this success I rigged up what was perhaps the first "bird-cage" antenna, constructed of lamp cord fastened to barrel hoops, and hung this to the top of the flag pole of the main building.

My first long distance experiments were made on the roof of the Lakota Hotel about a half mile from the Institute. I shall never forget the thrill I experienced when I first heard dots and dashes transmitted by Smythe, who was at the key of the coil at the Institute.

My next attempt was to the tower of the Auditorium. This also was a success.

Prof. Freemon thereupon arranged with some friends who owned a small yacht to put a transmitter on the yacht while I installed my receiver on the Three Mile Crib in the lake.

The yacht sailed out to the horizon while transmitting signals and I was able to detect these practically throughout the entire voyage. There was considerable newspaper publicity resulting from this demonstration.

Shortly after this, a friend of mine in Jersey City made arrangements with the Publisher's Press Association of New York for me to report the forthcoming International Yacht races off Sandy Hook, and the entire apparatus, including a new condenser transmitter designed by Prof. Freeman, was removed to Jersey City.

The reporting of these yacht races, both by Marconi and myself, may be considered as a complete fiasco, largely because of our mutual "jamming" of each other.

The above work terminated my connection with Armour Institute of Technology, but my connection there enabled me to launch my career in wireless to an ultimate success which might never have been attained otherwise.

I shall always regard my association of that date with affection and high regard.

Cordially yours,
LEE DE FOREST.

Harold A. Vagtborg

IMPROVEMENTS IN BUILDINGS AND GROUNDS

WITH the appointment last April of Professor Harold A. Vagtborg as Superintendent of Buildings and Grounds and a committee from the Board of Trustees consisting of Mr. Alfred S. Alschuler and Mr. Newton C. Farr to co-operate with him, the Institute has inaugurated a significant program of planned rehabilitation. According to President Hotchkiss, "the function of this group is to develop a planned program of improving our facilities and of obtaining the maximum benefit of our present plant to enable us to meet the increased load brought about by a larger enrollment and by the establishment of the Research Foundation. Improving our present plant does not conclude that we are not going to move; rather, it will be a means of stepping up our efficiency and developing the enthusiasm of our students and faculty."

By August, complete working drawings of all buildings were completed, an analysis of laboratory and classroom loads was made, and a plan formulated which, it is believed, will most practically utilize existing buildings for present and reasonable future activities of the Institute and the Research Foundation.

Extent of Plan

In the Main Building, the plan provides for enlarged Chemistry laboratories by eliminating classrooms and installing more modern equipment. The Electrical Engineering laboratories will be extended, when required, by the removal of the Administration and Business offices to remodeled quarters on the first floor of the 33rd Street Building. Improved library facilities will be provided by removing present bookstacks to the fifth floor and connected to the library by a flowing book conveyor. This change will require the removal of the present poorly lighted and arranged fifth floor drafting room to remodeled quarters in Chapin Hall.

Provision is made for converting the Mission Building into a Student Union by removing the Civil Engineering drafting room and classrooms to Chapin Hall.

The 33rd Street Building will be available for the exclusive use of the Research Foundation and the Administrative and Business offices of the Institute by removing the offices of the Civil Engineering, Fire Protection Engineering, and Social Science Departments to Chapin Hall.

When completely remodeled, Chapin Hall will provide considerably extended Physics laboratories, three large drafting rooms, eighteen classrooms, a Soils Mechanics laboratory, Sanitary Engineering laboratories, and several departmental offices. The number of classrooms and offices will be sufficient to replace those lost through changes and to provide for reasonable future demand. The unsightly wooden rear stairs are to be replaced by steel.

Improvements Completed

During the summer, such portions of the program were undertaken as would meet school opening requirements and would improve the general appearance of buildings and grounds.

Office and laboratories of the Research Foundation were provided in the 33rd Street Building for the projects underwritten.

In the Main Building the Organic Chemistry laboratory was increased 35% by removing one classroom and the Mathematics Department office, which was relocated in the remodeled office quarters of Chapin Hall. Forty additional students are provided for in the freshman Chemistry laboratory by the purchase of new equipment. The old "arena" floor of Science Hall was removed, the west windows were bricked in to reduce the noise from the railroad, and the room was completely redecorated and furnished with 205 new pedestal arm chairs. The fifth floor drafting room was rearranged, walls were treated to improve lighting conditions, and 2500 watts additional lighting added. The halls and staircases, as well as many rooms, were completely redecorated.

In Chapin Hall the first floor was remodeled in accordance with the plan, and provides six new classrooms, the Soil Mechanics laboratory, and a number of offices.

The floors of Science Hall, of the Research Foundation offices and laboratories, and of the remodeled quarters in Chapin Hall were sanded and refinished. In addition, the toilet rooms of the Mission Building are being completely remodeled, with the installation of new fixtures.

The landscaping program, undertaken last spring, has already been very effective. Further planting of trees and shrubs will be made this fall and completed next spring. Negotiations begun early in the summer resulted in the relocation of corner poles by the city and the rounding off of street corners, and the laying of 20,000 square feet of sidewalk by the Works Progress Administration.

A contract was recently awarded for the wrecking of the 34th Street Building. As soon as possible, the yard in the rear of Chapin Hall will be landscaped to provide an expanse of grass and shaded walks.

NEW TRUSTEES

Charles S. Davis

Robert I. Wishnick

CHARLES S. DAVIS, president of Borg-Warner Corporation, has had a long career of manufacturing experience. He is a prominent Chicago clubman and yachting enthusiast.

Mr. Davis was born in Terre Haute, Indiana. He graduated from Harvard College in 1899 and immediately following his graduation became a member of the editorial staff of the *New York Times*. He served as yachting editor for that publication for more than a year before returning to his native western Indiana, where he was engaged in coal mine operation and jobbing until 1907.

At that time he became secretary-treasurer, and later general manager, of Glascock Bros. Mfg. Co. of Muncie, Indiana, of which he is now president. He was secretary-treasurer of the Warner Gear Company of Muncie from 1919 until 1930. When the Borg-Warner Corporation was organized in 1928, Mr. Davis was named chairman of the Board of Directors. The following year he was made president of the corporation. He is now also president of the Warner Gear Division of Borg-Warner Corporation.

Mr. Davis is a member of the Chicago Club, Racquet Club, Union League Club, Press Club, Chicago Yacht Club, and the Columbia Club of Indianapolis, Ind.

* * *

In 1898, ROBERT I. WISHNICK migrated to America from his native Russia and settled in Chicago, where he attended the public schools. In 1914, he entered Armour, graduating in 1918 with the degree of B. S. in Ch. E.

While working as a chemist for the American Magnesia Products Co. he attended the Chicago Kent College of Law at night, obtaining the degree of LL. B. in 1917. In 1920, he organized Wishnick-Tumpeer, Inc., of which he is still president and treasurer.

Mr. Wishnick is also head of the Panhandle Carbon Co., Inc., the Century Carbon Co., and the Pioneer Asphalt Co.; treasurer of the Nitco Oil & Gas Co.; and a director of Nitco Ltd., London, England. He is a member of the Standard Club of Chicago and the Chemist Club of New York.

In June, Mr. Wishnick was elected member of the Board of Trustees as representative of the Alumni Association.

Summer Activities of the Faculty

A CONSIDERABLE number of the Armour faculty were on the job taking care of summer school and the cooperative courses. Several spent the larger part of the summer revising their courses, writing books, designing and building equipment, and making improvements in the laboratories. Thirty members of the faculty attended the annual meeting of the Society for the Promotion of Engineering Education held in June at Madison, Wisconsin. Professor Harry McCormack presented a paper at this meeting and Professor J. B. Finnegan took an active part on several committees.

Prof. E. H. Freeman attended the annual convention of the American Institute of Electrical Engineers at Pasadena, California.

Prof. Herbert Ensz was at Harvard taking an advanced course in soil mechanics.

Prof. D. P. Morton spent five weeks attending a special conference of teachers of Electrical Engineering conducted by the General Electric Co. at Schenectady.

Dr. W. M. Davis attended a joint meeting of the American Mathematical Society and the Mathematical Association of America held at Cambridge, Mass., in conjunction with the Harvard Tercentenary.

Dr. Rufus Oldenburger read a paper at the quadrennial meeting of the International Congress held in Oslo, Norway, in July.

Prof. John J. Schommer went fishing. He says that he has been called a "liar" more times than he can remember for his record-breaking catch of 1931; and this year he claims to have caught an even bigger fish; in fact, the largest caught by anybody in the north in the past 25 years. And he has a picture to prove it.

(Ed. note: The size of the fish would not permit its reproduction in the magazine.)

H. A. Giddings
S. H. Harper
J. E. Hobson

E. L. Kent
Jerrold Loebl
R. H. Manley

RECENT ADDITIONS

DR. HORACE A. GIDDINGS, of the department of mathematics, is a graduate of the University of New Hampshire.

He was a graduate student in the department of mathematics at the Massachusetts Institute of Technology from 1930 to 1934. At that time he received his Ph. D., majoring in geometry.

His basic scientific studies included mathematics, chemistry, physics, mechanical drawing, and thermodynamics. The mathematics covered algebra, plane and solid geometry, trigonometry, analytical geometry, projective geometry, higher geometry, differential geometry, tensor calculus, calculus, and functions of real and complex variables.

He has taught mathematics at the University of New Hampshire and at the Massachusetts Institute of Technology, supplementing his teaching with research work in the field.

Dr. Giddings showed his interest and ability in chemistry by winning the Bailey Prize at the University of New Hampshire. He is also a member of Alpha Chi Sigma, professional chemical fraternity, and Phi Kappa Phi, honorary scholastic fraternity.

* * *

STERLING HART HARPER, Professor of Construction and Architectural Practice, is a registered architect, forty-six years old, married, and the father of five boys. After graduation from the University High, Chicago, he pursued further education at the Massachusetts Institute of Technology. In 1914 he received his B. S. from the School of Architecture and then took a year of post graduate work at the same institution.

Prior to his college work he was employed by the Chicago architectural firm of Otis and Clark, and during his college course in Boston, he worked with Shepley, Ruttan, and Coolidge, designers of the present Art Institute of Chicago on Michigan Boulevard. For the two years following the completion of his education, he intentionally varied his services among the best architectural offices in Boston, acting as designer, clerk of works, draftsman, superintendent of structural and mechanical engineering, and, also, as writer of specifications.

In 1917 he joined his services with those of Monks and Johnson, also of Boston, and was in charge of important war work in Boston, Philadelphia, and elsewhere. Since that time Professor Harper's work has been of an extensive and widely varied nature. His services during this period have been divided between Hutchins and French of Boston, Meroll and Rand of Boston, Holabird and Root of Chicago, Benett, Parsons, and Frost of Chicago, the Federal Government, Montgomery Ward, and the State Architect of Illinois.

Some of the buildings in which he did the structural designing include the Michigan Square Building, Chicago; the U. S. Botanical Gardens, Washington; and the Rand Tower in Minneapolis.

* * *

DR. JESSE E. HOBSON, of the electrical engineering department, received the degree of B. S. in E. E. from Purdue in 1932; the master's degree in 1933, from the same institution; and his doctor's degree from the California Institute of Technology, in 1935.

While at Purdue Mr. Hobson was editor-in-chief of the *Purdue Engineer*, president of the Purdue chapter of Tau Beta Pi, president of the Purdue chapter of Triangle, vice-president of the Purdue Memorial Union, and a member of the Purdue Symphony Orchestra.

He is a member of Sigma Xi, the honorary science fraternity; Eta Kappa Nu, honorary electrical engineering society; Sigma Delta Chi, professional journalistic fraternity; Blue Key, national activity fraternity;

W. J. McLarney
J. A. Schaad
Louis Skidmore

J. T. Sorenson
G. C. Webber
Otto Zmeskal

TO THE FACULTY

Masonic fraternity, and an associate member of the A. I. E. E.

Dr. Hobson's ability has been evidenced by the successful application of his knowledge. He has designed, built, and put into operation a one million volt surge generator at the California Institute of Technology; he supervised the acceptance tests of the 138,000 volt circuit breakers to be used by the Los Angeles Bureau of Power and Light; and he assisted in performing tests on insulators to be used by the Metropolitan Water District of Southern California on the Boulder Dam-Los Angeles pumping line.

He has had experience as an instructor in various electrical and mathematical courses. His special interests in teaching are subjects related to high voltage phenomena, insulation, electrical circuits, power transmission, and engineering mathematics. In the research field he turns to high voltage and insulation. Dr. Hobson has published several papers which deal with high voltage measurements and are indicative of his interest in that field.

* * *

EARLE L. KENT, electrical engineer and inventor, comes as instructor in the electrical engineering department from Kansas State College where he did both his undergraduate and graduate work. Subsequently, he spent three years in television research and in other fields of electrical engineering.

Mr. Kent did not confine his undergraduate work to mere routine school work as was evidenced by the part he played in the college and the municipal bands. Mr. Kent has the distinction of having worked his way through college with a saxophone. More evidence of Mr. Kent's musical talent is found in his research work on the electric organ, on the subject of which he wrote his master's thesis.

He was granted a patent on Sound Recording and Reproduction Means and has patents pending on other new electrical sound devices. While at Kansas State, Mr. Kent constructed and demonstrated a mechanical man. It proved to be a success, and as a result, another robot, of better design, was built and presented on the west coast for nine months. It proved to be more of a hobby, however, than a money making enterprise.

Before coming to Armour Mr. Kent was in charge of the television station W9XAK. In 1935, he presented a paper before the A. I. E. E. on "Problems in Television." While at Kansas State he wrote a feature article for the *Kansas State Engineer* on "The Fourth Dimension," and "Riddles and Answers in Research." He is a member of Sigma Tau fraternity and Phi Kappa Phi, honorary scholastic fraternity.

* * *

Receiving his bachelor's degree from Armour Institute of Technology in 1921 and his master's degree in 1922, MR. JERROLD LOEBL began his architectural successes by winning the Armour Institute Traveling Scholarship and placing first in the Seconds and third in the Finals of the Paris Prize, in 1923.

Since 1925, under the firm name of Loebl & Schlossman, Mr. Loebl has delved into practically every field of architecture from residences to commercial buildings, from industrial jobs to restaurants. He is recognized by the men of the profession today as an authority on restaurant design, and among his works are the John R. Thompson Building, the John P. Harding Restaurants, O'Connel's, and the Walgreen Stores of A Century of Progress. On the Sholom Temple, Sheridan Road at Cornelia Street, the impressive beauty of which no one will deny, Mr. Loebl was associate architect.

* * *

DR. RALPH H. MANLEY, of the chemical engineering department, received his B. S. degree in chemistry from Beloit College in Wisconsin, in 1926, and was an assistant instructor at the University of Illinois from 1926 to 1928 while completing his work for his master's degree.

During the next seven years Mr. Manley was head of the chemistry department of the Municipal Junior College in Burlington, Iowa. In 1935, he was granted his Ph. D. degree from the University of Illinois in organic chemistry. The subject of his thesis was "The Effects of Substituents in the Rearrangement of Hydrazone and Pyrazoline."

Dr. Manley says that he is extremely anxious again to devote his time to active research work. He has a special interest in semi-micro quantitative analysis and has done work in this field for many years.

Dr. Manley is a member of Phi Lambda Upsilon, the American Chemical Society, and the Iowa Academy of Science.

* * *

WILLIAM J. McLARNEY, Instructor in Mechanical Engineering, received his Bachelor of Arts and Bachelor of Science degrees at the University of Iowa, and his Master of Arts at Columbia University.

Upon leaving Columbia he spent two years in the Bell Telephone and the General Electric Company laboratories developing various types of aircraft radios. He spent one year in private practice as an industrial engineer.

His research has been largely in connection with manufacturing at reduced production costs by changes of design, cost systems, and time and motion studies.

In 1933-34 he was chairman of the A. S. M. E. Junior Group in Chicago. This group made investigations into the consumer goods industries for the purpose of determining the extent of utilization of young engineers in those industries.

* * *

DR. JOHN A. SCHAAD, who comes to Armour as an Instructor in Chemistry, spent his first three years as an undergraduate at the University of New Mexico and then transferred to the University of Illinois, where he received both his bachelor's and doctor's degrees, the latter in 1936.

During the several years of his graduate work, Dr. Schaad taught quantitative analytical chemistry, and at one time taught this course to home economic students. In collaboration with several authors, he published a paper discussing "New Measurements of Previously Unknown Large Interplanar Spacings in Natural Materials." Dr. Schaad's interests lie in the field of applied X-rays, a subject in which he hopes to do some research work in the near future. He is a member of Phi Lambda Upsilon, Alpha Chi Sigma, and Sigma Chi fraternities.

* * *

Architect, designer, traveler, aviator in the World War—these give only a slight insight into the vast range of interests and accomplishments of LOUIS SKIDMORE, director of the school of architecture at Armour. Mr. Skidmore is 41 years old and the Senior member of the Chicago architectural firm of Skidmore and Owings. He received his academic training at Bradley Institute of Technology and his technical and architectural education at the Massachusetts Institute of Technology. While studying at M. I. T. he won the Rotch Travelling Fellowship, a competitive architectural award for students. Following the completion of his course in architecture he spent two years at the Ecole Beaux Arts in Paris and at the Student Atelier, American Academy of Rome. During this period he travelled over the greater part of the European continent. A third year was spent in collaboration with Samuel Chamberlain, the etcher, gathering materials and preparing drawings for the book *Tudor Architecture in England*. In Paris just prior to his return to America in 1929 he prepared presentation drawings for Raymond Hood's solution of the Century of Progress general plan. Returning to America he joined the World's Fair organization and was appointed Chief of Design. In November, 1933, Mr. Skidmore was appointed assistant general manager of the 1934 Fair in charge of design and construction. In collaboration with Mr. Owings he worked out a revised plan for the exposition and prepared designs and models for projects which were financed by the participation of industries. He has visited at different times the Barcelona and Seville Expositions, the Paris Exposition in 1931, the Brussels Exposition in 1935, the Deutsche Museum, the Kensington Museum of Science and Industry, and several others of lesser importance.

In addition to his work at Armour, he is consultant on the board of design for the New York World's Fair. Mr. Skidmore is married and has a young son.

The WILL must AIM at the SEEMINGLY IMPOSSIBLE.

—Bishop Brent.

JARL TAFT SORENSON, Instructor in Fire Insurance, is an alumnus whom Armour Institute of Technology is glad to welcome back. Graduating from the Carl Schurz high school, he entered Armour in 1929, and soon participated in a variety of activities, becoming Editor-in-Chief of the *Armour Engineer* in his senior year. He still regards highly his membership in Tau Beta Pi, Salamander, Sphinx, and Theta Xi fraternity.

He received his B. S. in Fire Protection Engineering in 1933, and studied law for two years at the John Marshall and Cleveland Law Schools while employed by the Ohio Inspection Bureau as a fire insurance inspector and engineer. In March of this year, Mr. Sorensen became connected with the Western Actuarial Bureau in Chicago as a fire insurance engineer and actuary until he obtained his present position at Armour, where, to all appearances, he will enjoy continued success.

* * *

DR. G. C. WEBBER, a member of the mathematics staff, is a native of Canada. He graduated from the University of British Columbia, and received his master's degree from his alma mater in 1932. Transfering to the University of Chicago, he received his Ph. D. in 1934, with a thesis on "Waring's Problems for Cubic Functions."

From 1934 to 1936, Dr. Webber was a National Research Fellow at Brown University and the University of Pennsylvania, engaged in research work on the number theory and in teaching.

Stamp collecting is his hobby, which he is resuming after a lapse of several years. Dr. Webber is married and has a year old son.

* * *

In June of this year, OTTO ZMESKAL, JR., received his bachelor's degree in chemical engineering from Armour Tech, and during the summer he worked for the Carnegie-Illinois Steel Corporation as an observer at a rolling mill. He now returns to his alma mater as Instructor in Chemistry and as an assistant in the metallurgical laboratory, working at the same time on the structure and properties of steel toward his master's degree. Mr. Zmeskal plans to continue his research and to remain in the teaching profession. He is a member of Alpha Chi Sigma, Tau Beta Pi, and Phi Lambda Upsilon.

WHEN the class of 1917 was at college, a long distance telephone call took (on the average) more than ten minutes to be put through. ¶ This time has been whittled down gradually, so that now the connection is made in an average of 1.4 minutes—nine out of ten of them while you hold the line. ¶ But this is only one phase of the relentless effort to improve. Your service is better today because voice transmission is clearer—interruptions and errors less frequent than ever before. ¶ America demands fast but sure telephone service—and gets it.

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What's going on

Student Ratings Released for Second Semester '35-'36

According to figures released by the Registrar's office, the average of the entire student body is 1.62 for the second semester of '35-'36. The senior class leads with an average of 1.96. Engineering science students lead the departments with 2.08. Theta Xi is ahead of the other social fraternities with 1.87. Tau Beta Pi secured the highest place of honoraries with an average of 2.58.

* * *

Senior Class Keeps Commission Form

The class of '37 will have the distinction of being the first graduating class to have a commission form of government. In this form, representatives from each department are elected to the commission to assist the president of the class.

* * *

Largest Enrollment in History

Enrollment figures for this semester show 825 enrolled in the day classes. This is the largest registration in the school's history. The freshman class leads with an enrollment of 273.

Conservative estimation of the night school registration now approach 1,400 as the enrollment is being checked by the Registrar's office.

* * *

Happy Days Are Here Again

According to latest reports, employment of graduates of June, 1936, has reached a high of 96 per cent. All of the Fire Protects, Civils, and Science grads have been placed, while the Archs. have 86 per cent, the Mechs. 93 per cent, the Chems. 94 per cent, and the Elecs. 97 per cent employed.

* * *

Juniors Win Interclass Baseball

The junior baseball team with Green on the mound, defeated the seniors, 4-3 and the sophomores 4-1, thereby annexing the interclass baseball title!

President Welcomes Incoming Students

At their first assembly September 22, members of the forty-eighth freshman class at A. I. T. were welcomed to the campus. Dr. Hotchkiss, Dean Heald, and Assistant Dean Tibbals spoke.

* * *

Professor Snow Retires

Professor John E. Snow of the electrical engineering department, who became a member of the faculty of Armour Institute in 1894 and was the senior ranking professor in the school's service, has retired.

* * *

Dr. Tibbals Appointed Assistant Dean

Dr. C. A. Tibbals, Professor of Analytical Chemistry, has been appointed assistant dean. In addition, Dr. Tibbals will direct a personnel service for the guidance of the Freshmen and of other students.

* * *

Ten Freshmen Receive Scholarships

Of the 132 men who took the competitive examinations for the Freshman Scholarship awards last May, ten were awarded full scholarships. The complete list of awards is as follows:

D. I. Dykstra, Central High, Nicoma, Okla.; John R. Gerhardt, Oak Park; Joseph H. Greenberg, Crane; Walter H. Kohl, Leo; Clarence Laskowski, Proviso; John M. Lenoir, Senn; Henry F. Newman, Lane; Philip I. Robinson, Tilden; Chas. J. Ryan, Jr., Calumet, and Wm. F. Yeager, Evanston.

* * *

School Undergoes Remodeling

Talk current for fifteen years or more has been transformed into action. The manifestations of the new spirit are everywhere apparent in a definitely improved appearance. Chapin and Science halls and the chemistry laboratories have been enlarged and rehabilitated and the Grounds have been beautified under the capable direction of Professor Harold J. Vagtborg, Superintendent of Buildings and Grounds.

* * *

Seniors Given Honor Scholarships

Seven seniors have been awarded half scholarships. The winners of the scholarships are: M. H. Beckman, Arch.; A. Goldsmith, E. E.; W. B. Graupner, E. E.; S. M. Miner, M. E.; J. J. Penn, Eng. Sc.; H. M. Ross, C E., and E. A. Heike, Ch. E.

* * *

J. Bobhill and P. Cump Win Drawing Awards

Two Armour students, J. A. Bobhill and P. W. Cump, were awarded first places in the National Drawing Competition sponsored by the drawing section of S. P. E. E. at its annual meeting held last June at the University of Wisconsin.

* * *

Hackman Manager of Intra-murals

Frank Hackman has been named intra-mural sports manager by E. Heike, A. T. S. A. president.

* * *

Siegal and Kahles Receive Fellowships

Louis Siegal and John Kahles, Ch. E. graduates of the Class of 1936, have received graduate appointments. Siegal is a graduate fellow on the coal research project at Armour and Kahles a fellow at the University of Cincinnati.

* * *

Freshmen Handshake

On September 30, freshmen and other new students had the opportunity of meeting upper classmen and faculty members at the traditional Freshman Handshake.

* * *

Harold W. Hoebel Leaves Institute

Harold W. Hoebel, chemical engineering laboratory assistant, has left the Institute. He has accepted a position in the sales promotion department of the Wrisley Soap Co. His cheerful personality and characteristic "quarter-to-five, gentlemen" will be sorely missed in the halls of "Main."

Engineering Catches the Crook

(From page 7)

in a gun, pressures of combustion gases varying from 10,000 to 45,000 pounds per square inch are developed. These push the bullet out of the gun barrel. But since action and reaction are equal and opposite, the same pressure forces the cartridge case back against the breech face. As a result of this terrific pressure, the soft copper of the percussion cap or primer (in center fire ammunition) is pressed into these scratches in the steel of the breech face, giving a "fingerprint" of that particular surface. Thus, at the scene of a shooting with an automatic pistol or a sub-machine gun, we may find several cartridge cases which had been automatically thrown out of the gun. From the prints of the breech face which we find on these, we may be enabled to identify the particular weapon used in the crime. (Fig. 3.)

In a similar way, peculiarities of firing pins which are left in the surface of the copper percussion caps, may serve to identify a weapon as having fired certain cartridges. And in automatic pistols, rifles, and shotguns, the marks on the fired cartridge cases which are left by the claw-like extractor or the ejector mechanism, may serve to identify a certain weapon as having been used in the shooting.

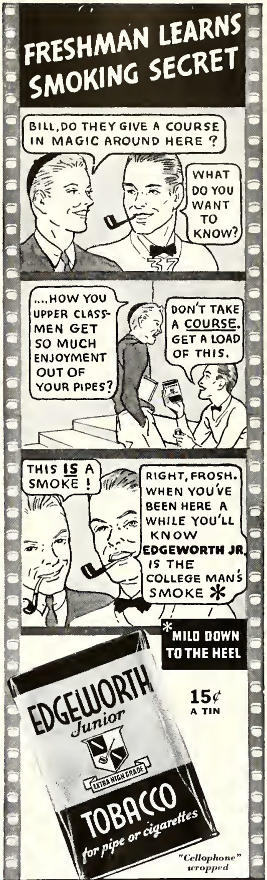
A rather interesting extension of this same principle involved marks left by the jaws of a bolt-cutter. In a large city in Wisconsin, a number of burglaries had been reported in which the method of entry was almost identical. Each of the buildings (garages, warehouses, etc.) was locked by padlocks which the burglar had cut by means of a cutting tool, presumably a bolt cutter. Finally, through a search of pawn shops, some of the stolen goods were traced to a mechanic. A search of his flat disclosed not only more of the stolen goods but also a powerful bolt cutter. By cutting bars of mild steel similar in diameter to the evidence padlocks, it was possible, by comparison of the microscopic scratches left by the cutting jaws, definitely to identify this cutter as the instrument used in all of these burglaries. (Fig. 4.)

The same general technique has been applied to knives, screw drivers, small crowbars, and burglars' jimmys.

Another application of this general principle served to identify wire used in the construction of a time-bomb responsible for blowing up the power house of a mine in the Illinois coal fields. In the manufacture of the time-switch for setting off the electric blasting cap and exploding the dynamite charge, short lengths of No. 12 gauge copper-clad steel wire were attached to the alarm-winding key of an alarm clock but insulated from it by tape. When the alarm went off, this wire turned with the key and made an electrical contact. Other evidence in the case threw suspicion upon the owner of a radio repair shop. A search of his shop revealed a small amount of the same gauge of copper clad steel wire. However, a comparison of the wire from the bomb with that from the shop showed that both had the same microscopic marks of a certain wire-drawing die (Fig. 5). Such dies, made of chilled cast iron, carbides of tungsten or molybdenum, or even diamond—are not perfectly circular and leave small lateral scratches on the wire which passes through them. Because of normal wear of the die, these irregularities are constantly changing so that the marks left by a certain die change appreciably during the drawing of from 10 to 20 feet of wire. Thus, in this case, it could be stated that the wire used in the construction of the bomb was not only from the same drawing as that in the radio repair shop, but was from the same 10 foot section of that particular piece of wire. This point was one which was important in building up an unanswerable case of circumstantial evidence resulting in the conviction of the bombers.

We usually think of metallography as of importance in studying the strength of metals or their failure under particular stresses. It also plays a part in tracing criminals. Serial numbers stamped into metal, such as in automobile motors, typewriter frames, or firearms, are sometimes ground off so as to prevent the tracing or identification of the particular article. Such grinding is often so thorough as completely to obliterate the serial number. The criminal forgets, however, that when the number is stamped into the metal, the

(Turn to page 23)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Sports Review

Krafft Resigns, Stenger New Coach . . . .

W. C. Krafft, basketball coach and gym instructor for the last fifteen years, has resigned to devote his entire time to his insurance business. No more need be said about Bill: his record speaks for itself. His duties will be performed in the future by Grant N. Stenger, who comes from a successful stay at Wheaton High School.

Stenger received his preparatory school training at Naperville High, from which he graduated in 1915. Like his predecessor he took a course in Physical Education at North Central College. Here he received honors in baseball, basketball, and football, being chosen all-state fullback, and all-tournament guard in 1915. After two years, the war broke out, and he spent the next two years overseas, coming back to graduate in 1921.

Upon leaving school he accepted a position as athletic director at the Richmond, Indiana, High School, where he spent one year. He held the same title for a year at Wabash, Indiana, four years at Ottawa, Illinois, and the last nine at Wheaton. Grant's record for these fifteen years shows eight basketball championships. This is proof enough of his ability, which combined with Armour talent should result in some first rate teams.

At the same time that he appointed Stenger, John Schommer also appointed R. O. "Pop" Warner, co-captain of last year's five, as freshmen coach.

* * *

Cross Country Revived . . . .

Largely because of the efforts of Coach Norm Root and Manager R. E. Winkler, cross country track has been revived at Armour. The first meet will be the Loyola invitational, but others will follow soon. The distance men of the track team have turned out en masse for this event. To date the squad is made up of H. J. Bodnar, C. H. Deuter, R. M. Faust, and M. L. Dannis. R. Cioce, a transfer from North Central, has had a couple of years' experience in cross country there, and will probably be the mainstay of the team.

NEW COACH

Grant N. Stenger

Fencers Reorganize

The Fencing Club of Armour has again reorganized. Last year, W. N. Setterberg, the personnel director, was the sponsor of the club; he has again assumed this position for the coming year.

* * *

Intra-Mural Sports . . . .

Last year a new significance was given to intra-mural athletics when the A. T. S. A. appointed a manager to arrange schedules and attend to other details. This year, under the guidance of Frank Hackman, intramural athletics promise to become an even more organized part of the extra curricular school activities. With the slipshod schedules and unplanned programs a thing of the past, more students should find time to participate in these events.

The program this year started off with baseball. The Juniors captured the title. The touchball tournament is entering the final stages, but as yet no team has first place "cinched." The golf and tennis tourneys, under the direction of Coaches Bibb and Colvert, are also in the finals. It is hoped that they will discover some new talent for their teams.

Fraternity Notes

The rushing season was officially ended with pledgings on October 9. This year, rush week proved to be one of the most successful in many years. The *Phi Kaps* led with nineteen pledges. The *Delts* were second with eighteen. All of the fraternities did very well.

The Halloween dances, which will be held at most of the houses on the thirty-first of October, are receiving a great deal of attention at the moment. The *Delts* are having a hard times party. *Phi Pi, Pi Kappa Phi,* and *Rho Delta Rho* are having their pledge dances on that night. The *Phi Kaps* are also having a Halloween party. *Triangle* is having a masquerade dance.

Interfraternity sports are getting under way. The *Phi Pi's* are out for their eighteenth consecutive victory in basketball. There appears to be a number of good teams on the campus, however. Some touch football games have been scheduled between several of the houses. Competition is keen even though it is not an official interfraternity sport.

The *Delts* are planning an alumni banquet to be held in the very near future. *Rho Delta Rho* has had several alumni smokers. Four *Triangle* men visited the Illinois chapter for the Illinois homecoming. The *Phi Kaps* held a dance on October 17. Plans are under way for the *Delt* pledge dance which is to be held the last part of November. *T. X.* is having their pledge formal November 7, at the Interfraternity Club.

Interfraternity ping pong does not start for a while, but *Rho Delta Rho* is having a house tournament now as well as a house pool tournament.

Pi Kappa Phi held a Mother's Tea October 11. The *Delts* are having their second tea November 8.

If you want more news about your chapter, drop in at the house sometime. The fellows will be glad to see you.

Engineering Catches the Crook

(From page 21)

crystal structure of that metal is altered underneath the imprint of the number itself. And this altered crystalline structure, although invisible, may be brought out by the application of the proper metallographic etching reagents so that it may be seen with the unaided eye or even photographed. Fig. 6 shows the frame of a 38 caliber Colt Detective Special revolver which had been used in the murder of a newspaper reporter in Chicago. After the assault, the assailant threw the weapon aside. The gun was "dusted" for fingerprints and then brought to the laboratory for examination. The serial numbers had been completely removed by filing or grinding as seen in the left half of Fig. 6. These scratches were ground out by light use of very fine emery paper and the etching reagent applied. The serial number soon became quite legible. A long distance telephone call to the Colt Firearms Company gave the police information that this particular gun had been sold to a certain jobber. The jobber, reached by telephone, reported that the gun had been sold by him to a local sporting goods dealer, and a police squad sent to the shop of this dealer learned that this gun and five others like it had been purchased by a well known "hoodlum." While this tracing of the gun did not solve this particular case, it did give the police some clue as to which gang might be able to furnish information as to the shooting.

These are only a few of the ways in which engineering principles have been utilized in tripping-up and trapping the wrongdoer. Future developments in our technical skill and ability to make more accurate observations and measurements will probably increase the importance of engineering technique in protecting society from those who wilfully violate its rules.

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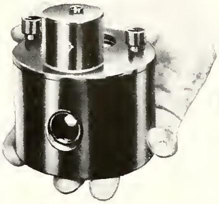

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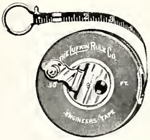

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Progress

(From page 12)

dowment to put our activities on a sound footing. These efforts appear distinctly promising.

Conspicuous among new service to the Institute is the aid given the Department of Architecture by an advisory committee of five architects, of which Mr. John A. Holabird is chairman. Three members of this committee, Mr. Alfred S. Alschuler, Mr. C. Herrick Hammond, and Mr. Jerrold Loebl, are alumni. The fifth member is Mr. Alfred Shaw of Graham, Anderson, Probst, and White. When it was found that pressure of other work would bring about the withdrawal of Professor Earl H. Reed as Director, the committee instituted a world-wide search for a successor, finally recommending the appointment of Mr. Louis Skidmore, of Skidmore and Owings. Mr. Skidmore, a graduate of Massachusetts Institute of Technology, and a winner of the Rotch Traveling Fellowship, spent three years traveling in Europe and studying at the Ecole Beaux Arts and the Academy of Rome. He was Chief of Design and later Assistant Director of the Exhibits Department for "A Century of Progress." In 1933, he was appointed Assistant General Manager for the 1934 Fair, in charge of all design and construction. Recently he has been appointed a member of the Advisory Commission for the 1939 New York World's Fair, along with Mr. Emil Saarinen and Mr. Paul Cret. Mr. Loebl, a member of the advisory committee, will serve as Assistant Director, and the committee will continue its valuable cooperation with the Department. It is believed that the result of articulating work of the Department with the architectural profession through the medium of such a distinguished committee will be of increasing importance in keeping Armour in the forefront of architectural education.

One of the encouraging features of the Program of the past year has been the help of various kinds given by alumni. In this connection, special mention should be made of the service which Mr. Edwin O. Griffenhagen has rendered in connection with our business office policy, procedure, and personnel. Mr. Griffenhagen is a member of the class of 1906 and of the Board of Trustees. His study was especially timely in relation to setting up the Research Foundation and coordinating its accounts with those of the Institute. Mr. Griffenhagen's report has been approved by the Executive Com-

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Progress

(From page 24)

mittee, and is being installed under the supervision of Griffenhagen and Associates.

During the past decade, Armour has passed through a period which has tested the mettle of those who have been responsible for continuing its work on the high level which its history and traditions require. Trustees, alumni, faculty, and friends, in spite of individual burdens incident to the depression, have stood by loyally. Members of the Executive Committee have been untiring in their efforts to keep the Institute going forward. In view of all these efforts and of the devotion and team-work which has been manifested in surmounting obstacles, it is a privilege and an inspiration to report that Armour is forging ahead.

WILLARD E. HOTCHKISS.

Dost thou love life? Then do not squander time, for that's the stuff that life is made of.

—Franklin.

DO NOT DO THAT WHICH YOU WOULD NOT HAVE KNOWN.

—Franklin.

No nation can rise higher than the character of its people.

Let me not pray to be sheltered from dangers, but to be fearless in facing them.

—R. Tagore.

He that hath TRUTH ON HIS SIDE is a fool as well as a coward if he is afraid to own it because of other men's opinions.

—Eliz. Barrett Browning.

TEMPERANCE and LABOR are the two best physicians of man.

—Rousseau.

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ALUMNI NEWS

Election Results

At the annual meeting of the Armour Tech Alumni Association held June 2, in Chicago. John J. Schommer, Ch.E. '12, was reelected president; J. Warren McCaffrey, Ch.E. '22, was elected vice president; and D. P. Moreton, EE. '06, was reelected secretary-treasurer, all to serve for a term of two years. The following men were elected to the Board of Managers: PHILIP HARRINGTON, E.E. '06, to represent classes of 1902-1906; ARTHUR KATZINGER, M.E. '16, classes of 1912-1916; and HARVEY C. ROSSING, C.E. '32, classes of 1927-1931.

At the same meeting, ROBERT I. WISHNICK was elected to the Board of Trustees as alumni representative.

Awards

One of the features of the banquet held in connection with the annual meeting was the conferring of awards.

To CLARENCE W. MUEHLBERGER, Ch.E. '20, was given the "Distinguished Service Award" in recognition of his exceptional professional service as a toxicologist and in appreciation of the honor which his accomplishments have brought to the Institute and to its alumni.

This same award, the highest the Alumni Association can give, was previously conferred upon Francis Gladheim Pease, EE. '01, M.S. '24, and honorary D.Sc. '27, astronomer and engineer of Mt. Wilson Observatory, Pasadena, California.

To DAVID PENN MORETON, E.E. '06, secretary and treasurer of the Alumni Association and professor of alternating and direct current machinery, went the "Service Award Key" in recognition of his loyal and willing service during the year. In awarding this key the Association expressed its appreciation of Professor Moreton's efforts in promoting the best interests of the alumni.

The previous recipients of this award are John J. Schommer, Ch.E. '12, and Harold W. Munday, C.E. '23, both members of the Board of Trustees.

The senior class honor, the "Award of Merit," was conferred upon DONALD J. NEAL, as an outstanding member of the graduating class, in recognition of his high scholastic record, his participation in extra curricular activities, his interest in all phases of college life, and his contributions to the character of the student body.

1897

Benjamin H. Glover, E.E., is engineer of equipment at the Underwriters' Laboratories, 207 E. Ohio St., Chicago.

Robert V. Perry, M. E., is professor of machine design at Armour Tech. Professor Perry is working hard to keep ahead of his fellow faculty members at bridge.

1898

A recent note from Harry MacClyment, E.E., requested a list of the members of the 1898 class and their addresses. He may be reached at 516 Seaton Street, Los Angeles, Cal.

Edward W. Leeper, E.E., has the position of engineer for the insurance firm of Rollins Burdick, Hunter Co., 175 W. Jackson Blvd., Chicago.

1899

William B. Pavey, E.E., is president of the Economy Engineering Co., Chicago.

Morris W. Lee, M. E., has his office at 220 S. Michigan Ave., Chicago, and extends a warm welcome to all Armour Tech men.

1900

Fitzhugh Taylor, E.E., is fire protection engineer for the Underwriters Laboratories at 207 E. Ohio St., Chicago.

Vernon S. Watson, Arch., is a member of the firm of Tallmage and Watson, 19 E. Pearson St., Chicago.

1901

Fritz A. Lindberg, E.E., is chief engineer for Armour and Co., Union Stock Yards, Chicago.

Oscar A. Rochlitz, E.E., is associated with the Kroeschell Co., Chicago.

Francis Gladheim Pease, E.E., is astronomer and engineer at the Mt. Wilson Observatory, Pasadena, Calif.

1902

Three members of this class are on the Armour Tech Faculty with the following titles. E. E. Freeman, E.E., is professor of electrical engineering and director of the option; Edwin S. Libby, M.E., is professor of refrigeration engineering; Henry L. Nachman, M.E., is professor of thermodynamics.

1903

George W. Niestedt, M.E., is a member of the engineering firm of Weiss and Niestedt, Chicago. Reports indicate that he is doing a good job.

Arthur Wagner, E.E., is president of Arthur Wagner Company, Chicago. We are just informed by Mr. Wagner that they are at present making extensive changes in their quarters at 701-703 W. Washington St., Chicago, and invite their friends to pay them a call.

1904

Clarence T. McDonald, E.E., is pres. of the Multi-Electrical Mfg. Co., Chicago, manufacturers of high grade industrial lighting equipment.

Daniel Roesch, M.E., is professor of automotive engineering at Armour Tech. One would have to pay the automotive laboratory a visit in order to appreciate the many devices which have been developed and built to assist in a complete investigation of engine performance.

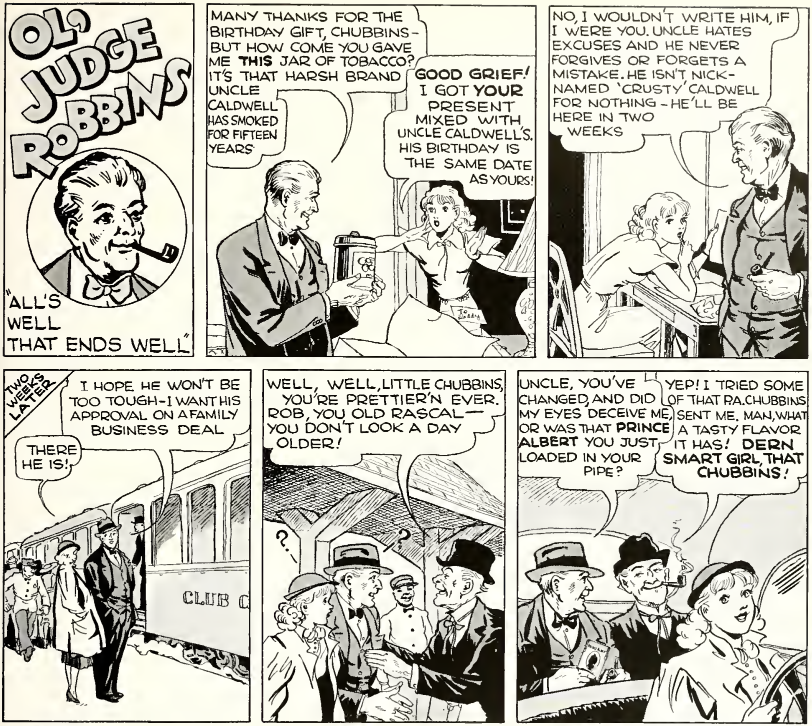
Louis J. Byrne, M.E., is with Anson Byrne and Co., Chicago, representing several manufacturers of mechanical machines and equipment. Many of the graduates of Armour Tech. remember Mr. Byrne, as he had charge of the Armour Alumni Loan Fund for several years.

James C. Peebles, E.E., is professor of experimental engineering at Armour Tech. Professor Peebles has devoted a great deal of time to practical problems involving thermal conductivity, and has developed a machine for making thermal conductivity measurement, which has met the approval of the engineering profession.

1905

Frederick C. Heine, E.E., is a power solicitor for the Commonwealth Edison Co. He has been a frequent visitor to Armour Tech during the last few years for perhaps no other reason than to see and hear his son perform on the accordian. Bertram F. Heine, '37, is following his father's

(Turn to page 28)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TWO WEEKS LATER
I HOPE HE WON'T BE TOO TOUGH - I WANT HIS APPROVAL ON A FAMILY BUSINESS DEAL
THERE HE IS!
CLUB C
WELL, WELL, LITTLE CHUBBINS, YOU'RE PRETTIER'N EVER. ROB, YOU OLD RASCAL — YOU DON'T LOOK A DAY OLDER!
?
?
UNCLE, YOU'VE CHANGED, AND DID MY EYES DECEIVE ME, OR WAS THAT **PRINCE ALBERT** YOU JUST LOADED IN YOUR PIPE?
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example in at least one respect; that is, he is giving considerable attention to the subjects in electrical engineering, with graduation less than a year away.

John C. Penn, C.E., is professor of civil engineering and director of the option. Professor Penn is actively engaged in promoting several new projects in the civil department: a filtration laboratory under the direct supervision of Harold A. Vagtborg, assoc. prof. of municipal and sanitary engineering; and the installation of a soil mechanics laboratory under the direct supervision of Herbert Ensz, assoc. prof. of civil engineering.

1906

The class of 1906 held its thirtieth reunion on the afternoon and evening of June 2nd, 1936, at the Medinah Club of Chicago. The following members of the class were present, and the time passed too swiftly for all the stories and experiences to be told. O. T. Allen, A. C. Allyn, J. W. Clucas, W. R. Collins, F. J. Flanigan, W. H. Flood, T. S. Ford, E. G. Griffenhagen, Philip Harrington, E. F. Hiller, C. Holcomb, V. A. Houghton, C. S. Johnson, R. W. Layer, W. J. Linenger, L. H. Miller, D. P. Moreton, Victor Nicholson, H. J. Quinn, L. R. Ross, Franklin Wanner, and Max Woldenberg.

An attractive banner was presented to the musical organizations of Armour Tech at the banquet held in conjunction with the regular spring Alumni meeting.

1907

Frederick G. Heuchling, CH.E., is pres. of Assured Investment Co. of America, 506 S. Wabash Ave., Chicago. Fred, if we are correctly informed, is becoming quite an authority on personnel work.

James C. Matchett, M.E., is vice pres. and gen. mgr. of the Illinois Engineering Co., Chicago. This company handles all kinds of heating problems.

1908

William Trinkaus, Jr., C.E., is now acting chief engineer for the Sanitary District of Chicago. Philip Harrington, E.E., '06, who holds the title of chief engineer for the Sanitary District, is on a temporary leave supervising an investigation of Chicago's traction problems.

George B. Mulloy, M.E., is a member of the firm of Brady, McGillivry, and Mulloy, consulting engineers, with offices at 37 W. Van Buren St., Chicago.

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Roe L. Stevens, C.E., is a member of the civil department faculty at Armour Tech with the title of assoc. prof. of bridge and structural engineering.

1909

Percival Downton, E.E., is representative for the Electric Storage Battery Co. in Minneapolis, Minn.

Henrick Harger, C.E., is state district engineer for the Illinois Highway Dept. at 35 E. Wacker Drive, Chicago.

Elmwood M. Pinkerton, E.E., is district representative for the General Electric Co., with offices at 107 S. 5th St., Minneapolis, Minn. Mr. Pinkerton pays Armour Tech a visit each spring and assists Mr. M. M. Boring, of the General Electric Co., in picking students for their training course.

1910

A. A. Byers, M.E., is president of the Central Motor and Repair Co., Chicago.

Herbert W. Martin, CH.E., is in the research laboratories of the Peoples Gas Light and Coke Co., Chicago.

1911

A short note from Garrett B. James, F.P.E., informs us that he is in the engineering dept. of the Western Factory Ins. Assn., 175 W. Jackson Blvd., Chicago.

J. K. Mabbs, E.E., is with the Linde Air Products Co. at 30 E. 42nd St., N. Y. C.

Ralph N. Freidman, Arch., is a member of the architectural firm of Alfred S. Alschuler Co., 28 E. Jackson Blvd., Chicago.

1912

Harvey A. Drew, E.E., is a sales engineer for the Edison Storage Battery Co. in their Chicago office at 111 N. Canal St.

Rupert J. Geisler, C.E., has a position with the Ready Power Co. of Detroit in their Chicago office at 612 N. Michigan Ave.

We recently learned that Paul A. Strong, E.E., has been advanced to assistant to the president of the R. C. A. Mfg. Co., Camden, N. J.

Henry C. Dormitzer, CH.E., is in the engineering department of Wilson and Co., Chicago.

1913

E. Roger Burley, M.E., is associated with the Available Truck Co., 2501 Elston Ave., Chicago, builders of truck chassis of all sizes.

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RAYMOND J. KOCH, E.E., is pres. of Felt and Tarrant Co., Chicago. By the way, this company makes the comptometer.

L. P. KORNFELD, C.E., is secy. of the Hamler Boiler and Tank Co., Chicago.

ARTHUR C. LILL, C.E., we understand indirectly, is recovering from a rather severe illness. We wish him a speedy recovery.

WALTER G. STANSEL, E.E., is in the signal dept. of the Illinois Central R.R., Chicago.

1914

LOUIS HIRSH, CH.E., is with the Security Life Insurance Co. of America with offices at 134 N. La Salle St., Chicago.

ROBERT W. WHITMORE, E.E., is with the Allen Bradley Co. at Milwaukee, Wis.

ALBERT N. KOCH, M.E., is associated with the Steel Plate and Shape Corp., at 15050 Woodward Ave., Detroit.

WALTER H. HALLSTEIN, C.E., is pres. of the Ilg Electric Ventilating Co., Chicago.

1915

HARLAN C. SKINNER, M.E., is associated with the Watkins Rebabbitting Service at 2346 S. Dearborn St., Chicago.

GUY F. WETZEL, Indus. Arts, who resides at 116 S. 5th St., Wilmette, Ill., is teaching in a Chicago high school.

OSCAR A. ANDERSON, M.E., is mechanical engineer for Armour and Co., Union Stock Yards. Chicago.

EDWARD J. BURRIS, E.E., is selling for the Illinois Electric Porcelain Co., 5263 Quincy St., Chicago.

We are pleased to learn that BRADLEY S. CARR, M.E., is rapidly regaining his health after an illness of several months. Mr. Carr is manager of the pump dept. of the American Manganese Steel Co., located at Chicago Heights, Ill.

1916

JOHN M. BYANSKAS, M.E., is with the Western Electric Co., at Hawthorne, Ill.

ARTHUR KATZINGER, M.E., is vice pres. of the Edward Katzinger Co., Chicago, manufacturers of tinware.

ELKER R. NIELSEN, Arch., is secretary of S. N. Nielsen Co., general contractors, with offices at 3059 Augusta St., Chicago.

HENRY B. WILKENS, CH.E., is pres. of Wilkens Anderson Co., 111 N. Canal St., Chicago.

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1917

Myron L. Summerfield, E.E., is assistant vice pres. of Panamerica-Blair Corp., 44 Wall St., N. Y. C.

John W. Tierney, C.E., is in the sales department of the Electric Storage Battery Co., Chicago.

Harold S. White, M.E., is superintendent of the proving dept. of the Studebaker Corp., at South Bend, Ind.

Edward D. Porges, E.E., and Abraham A. Corman, F.P.E., are pres. and vice pres., respectively, of the National Porges Co., at 227 W. Madison St., Chicago — wholesale dealers in electrical and sporting goods, radios, toys, etc.

1918

Everett R. Cole, F.P.E., is engaged in the general insurance business with offices at 175 W. Jackson Blvd., Chicago.

Jerome N. Golten (formerly Goldstein), E.E., is manager of the service department of the Stewart-Warner Corp., Chicago.

Axel A. Hofgren, E.E., is a patent lawyer, with offices at 105 W. Adams St., Chicago.

Wm. E. Belke, M.E., is gen. mgr. of the Belke Mfg. Co. at 947 N. Cicero Ave., Chicago.

1919

William Mendius, CH.E., is in the development dept. of the Sinclair Oil Co., East Chicago, Ind.

Erwing W. Petzing, E.E., is teaching electrical shop in the Chicago high schools.

Ernest E. McClung, CH.E., is a chemical engineer for the Illinois Central R. R., Chicago.

Daniel C. Berg, M.E., is with the Sherwin-Williams Co., at 115th St. and Cottage Grove Ave., Chicago.

Armada T. Weathers, CH.E., is with the City of Chicago, at the filter plant, 5845 Oglesby St., Chicago.

1920

Claus F. Peterson, M.E., is vice pres. of the Cuneo Press, Chicago.

Albert R. Throop, E.E., has been with the Illinois Bell Telephone Co. since graduation.

Hirsch Epstein, E.E., is engaged in the manufacture of electrical glass products, in Chicago.

Allen Q. Grant, M.E., is teaching at the Harrison technical high school, Chicago.

Benjamin W. Lewis, CH.E., is associated with Wishnick-Tumpeer, Inc., at 365 E. Illinois St., Chicago.

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1921

Rudolph Knotek, E.E., has been with Sears-Roebuck, Chicago, for quite a number of years and is at present in charge of the electrical division of their technical laboratories.

Everett E. Gramer, E.E., holds the position of chief engineer for the Standard Transformer Co., Chicago.

Derwood S. Chase, C.E., is associated with Field, Glore, and Co., Chicago.

Spenser N. Havlick, M.E., has a position with the U. S. Gypsum Co., Chicago.

Raymond C. Malvin, E.E., is pres. of Malvin and May Inc., located at 2427 S. Michigan Ave., Chicago.

Word reaches us that Arthur W. Jemke, M.E., was married on Sept. 26th to Miss Grace Coleman of Berkley, Ill. They reside at Wausau, Wis., where Art is engaged in the design of mechanical equipment for a paper mill. Good luck and happiness to you both.

1922

According to a recent write-up in the Chicago Tribune, Leo L. Reihmer, M.E., has been elected vice-pres. of the Lloyd-Thomas Co., Chicago, appraisal engineers. Leo is married and has two children and resides at 4545 N. Newhall St., Milwaukee. He will spend part of his time in Chicago.

1923

Chester W. Hauth, F.P.E., is associated with the Viking Automatic Sprinkler Co., 320 N. Elizabeth St., Chicago.

John V. Lizaro, M.E., is a patent lawyer with Hayward and Maredial, 230 Park Ave., N. Y. C.

Virgil E. Lowden, E.E., is with the Illinois Bell Telephone Co. at 212 W. Washington St., Chicago.

Harold W. Munday, C.E., is vice pres. of McGann Mfg. Co., 332 S. Michigan Ave., Chicago.

Merle C. Nutt, CH.E., is with the Moline Iron Works at Moline, Ill.

Harold M. Piety, E.E., is teaching at the Carl Schurz high school, Chicago.

1924

J. Stanley Farrell, E.E., has a position in the Illinois State Procurement Office of the U. S. Treas. Dept., Merchandise Mart, Chicago.

Royal M. Beckwith, F.P.E., is with the Western Actuarial Bureau at 222 W. Adams St., Chicago.

Elmer J. Biever, E.E., is working for the Commonwealth Edison Co., Chicago.

We understand that Benjamin Franklin, C.E., is with the Standard Oil Co., at Whiting, Ind.

Alan Joseph, M.E., is with the Royal Metal Mfg. Co., at Michigan City, Ind.

1925

C. J. Buck, E.E., is in the engineering dept. of the Chicago Rapid Transit Co., 72 W. Adams St., Chicago.

Morton L. Landreth, E.E., is with the Western Electric Co., Hawthorne, Ill.

Lawrence E. Burke, M.E., is employed in the construction division of Sears Roebuck, Chicago.

Albert L. Stemwedel, E.E., is a member of the firm of Fee and Stemwedel, Inc., at 4949 N. Pulaski Rd., Chicago, manufacturers of hygrometers, thermometers, and barometers.

1926

H. J. Prebensen, E.E., is vice pres. of Air Comfort Corp., distributors of Carrier air conditioning products in metropolitan Chicago. We understand that Preb, who is in charge of engineering, construction, and purchasing, has quite a group of Armour graduates in his organization.

Arthur S. Hansen, E.E., is a consulting actuary with an office in the Board of Trade Bldg., Chicago. He is also a member of the Armour Tech faculty, teaching several courses in economics.

1927

James D. Green, C.E., supervisor in the real estate division of the trust dept. of the Northern Trust Co., Chicago, is in charge of several hundred pieces of city real estate and several mines. He says that his engineering training is of great service to him.

We understand that Earl D. Knickerbocker, Arch., is an equipment draftsman with Montgomery Ward, Chicago.

Charles W. D. Burcky, E.E., is in the engineering dept. of the Teletype Corp., Chicago.

Harold R. Nissley, E.E., is teaching economics at the Texas Technological College, Lubbock, Texas.

1928

A card from Lee F. Britton, F.P.E., brings the information that he is married and the proud father of a daughter. He is engaged in the general insurance business with Ewing, Britton, and Hood, 311 Philtower, Tulsa, Okla.

Marshall E. Reynolds, E.E., is carrying on development work in the laboratories of the General Household Utilities Co. at Marion, Ind.

Harold E. Larson, E.E., is with the General Electric Co. at Schenectady, N. Y.

We recently received word that Irving H. Bowman, Arch., is with the Union Carbide and Carbon Co., at Charleston, W. Va.

Irving B. Lueth, E.E., is teaching in the electrical dept. at Pratt Institute, Brooklyn, N. Y.

1929

Boyden W. Hindman, E.E., reports that he is now located in New Haven, Conn., selling for the Stewart Die and Casting Co. He is very enthusiastic over his work and has met up with a number of other Armour Tech men located in the east.

William N. Setterberg, Arch., is a member of the firm Setterberg, Kadic, and Schmitt, architects and engineers, 75 E. Wacker Drive, Chicago.

Robert E. Stempel, Arch., is in the construction office of the equipment department of Montgomery Ward, Chicago. He is also teaching machine drawing at the Carl Schurz high school.

Bob Faulkner, Arch., is working in the business department of Holabird and Root, Chicago.

1930

Norman D. Buehling, E.E., is located with Fensholt Co. advertising Agency at 360 N. Michigan Ave., Chicago.

Sidney L. Schwartz, CH.E., has a position with the U. S. Forest Products Laboratory at Madison, Wis.

Frank O. Zimmerman, E.E., is in the service dept. of the Westinghouse Electric Elevator Co., Chicago.

Clarence L. Carlson, M.E., is a salesman for the Powers Regulator Co., 2720 N. Greenview Ave., Chicago.

A short note from Leslie J. Weselik, M.E., brings the information that he is asst. chief engineer for the Barrett Co. at Peoria, Ill.

1931

Frank P. Ishmael, ex '31 Arch., is with the Federal Government in Washington, D. C., and is assisting Harry Bentley in the development of a settlement housing group for Milwaukee, Wis.

Jim McAlear, M.E., has a position with the Mason Neilan Regulator Co., Chicago. We understand that Jim was married this past summer, and that Walt Healy, C.E. '29, was pressed into service as best man. All kinds of success and happiness to you, Jim.

Orland R. Murphy, E.E., recently left the Utah Radio Products Co. of Chicago and is now in the engineering department of the Belmont Radio Co., Chicago.

Albert J. Aukers, CH.E., is with Victor Manufacturing and Gasket Co., 5750 W. Roosevelt Rd., Chicago.

Paul E. Seidelmann, F.P.E., is an inspector with the Ohio Inspection Bur., Cincinnati, O.

Alfred L. Mell, Arch., has his own office in Chicago and at present is assisting in design work in the architectural dept. of Armour Tech.

John McLane, Arch., is district architect for northern Illinois in the reforestation division of the U. S. Government. He is located at Starved Rock, Ill.

1932

Joseph DeOrio, E.E., was recently made Assistant Engineer for the Belmont Radio Co., Chicago.

Carl A. Erickson, C.E., is with the U. S. Engineers, and has recently been conducting some experiments at Lockport, Ill. in connection with the new water turbines installed by the Sanitary District.

We are informed that Max Schinke, E.E., has been traveling throughout the U. S. and Canada for the past three years for the Stewart Warner Co. of Chicago, doing field engineering work in connection with their radios and refrigerators.

Oscar Eskonen, C.E., is now stationed at New Orleans with the U. S. Engineers, having recently moved from Lincoln, Neb.

Word reaches us that Joe Palma, Arch., is married and that he is now head of the product design dept. of Montgomery Ward, Chicago.

David Chapman, Arch., spent his vacation cycling through Europe. Dave has a studio on the near north side, in Chicago, where he is practicing architecture and industrial design.

Harvey C. Rossing, C.E., is with the Board of Health, City of Chicago.

1933

Victor P. Peterson, E.E., is teaching electric shop at the DuSable high school during the day, and electricity and geometry at Fenger high in the evening. We notice Peterson is spending his spare time taking Professor Richardson's course EE-504.

Harold G. Reynolds, E.E., is service engineer for the Mills Novelty Co., Chicago.

Spencer B. Cone, Arch., is associated with Shepard Vogelgesang, 360 N. Michigan Ave., Chicago.

Robert Teague, Arch., has returned to Chicago from Dallas, Texas, where he was working on the exposition, and is now employed by Fred Keck.

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We understand that F. Clay Bartlett, Jr., Arch., is now living in Manchester, Vermont, and making quite a name for himself through his paintings.

Tom Luckett, Arch., is associated with D. X. Murphy, Architects, in Louisville, Ky.

William W. Lange, E.E., is with the G.E. X-Ray Co., Chicago, and has lately been specializing in the design of electro-cardiographs.

Arthur B. Bronwell, E.E., is with the Commonwealth Edison Co., and is teaching in the evening school at Armour Tech.

1934

R. H. Blom, CH.E., formerly with the North Shore Coke Co. of Waukegan, Ill., is now with S. W. Shattuck Chemical Co., 1805 S. Bannock St., Denver, Colo.

Rolland McFarland, CH.E., paid us a call a few days ago. He is with the Union Carbide and Carbon Co. at Whiting, Ind.

We received an announcement of the marriage of Miss Helene Mae Ullrich to Barry Michael Kostenko, C.E., on August 22nd. Congratulations and best wishes.

Mark L. Henoch, E.E., is purchasing agent for W. M. Welch Mfg. Co., Chicago.

We have received from Mr. and Mrs. Robert F. Simpson, an announcement of the arrival of Richard Wiley Simpson on Sept. 17, 1936.

1935

Phillip J. Henoch, CH.E., is asst. metallurgist at the south works of the Carnegie-Illinois Steel Co.

John Citro, CH.E., paid us a short visit a few days ago, and we learned that he is now making use of his chemical engineering work in operating the Citro Little Cafe, Chicago.

George Uelson, C.E., is employed at the U. S. Waterway Experimental Station at Vicksburg, Miss.

1936

A letter from Robert H. Knabe, C.E., brings the information that George Savidis and Fred A. Smith are also working for the Chicago Park District, and making good use of their training at Armour Tech.

Walter Tallafuss, CH.E., is a junior engineer with the Air Comfort Corp., Chicago, specializing in residential air conditioning.

Donald C. Graham, E.E., is taking the student training course with the General Electric Co. He recently was transferred from the Erie works to Pittsfield, Mass., where he is working on transformer tests. Judging from Graham's letter, he is quite enthusiastic over the G. E. training course.

Harry G. Gragg, F.P.E., is service manager for the Air Comfor Corp., Chicago.

W. J. Fleig, E.E., is attending th U. of Ill., where he is taking th course in patent law.

R. H. Bothwell, E.E., is at th Grand Rapids branch of the Grayba Electric Co., taking their sales engineering course.

Ray Mansfield, E.E., is in th production department of the Culte Hammer Co., at Milwaukee, Wis.

N. J. Cooper, E.E., is field engineer in the radio repair department o the Stewart Warner Co., Chicago.

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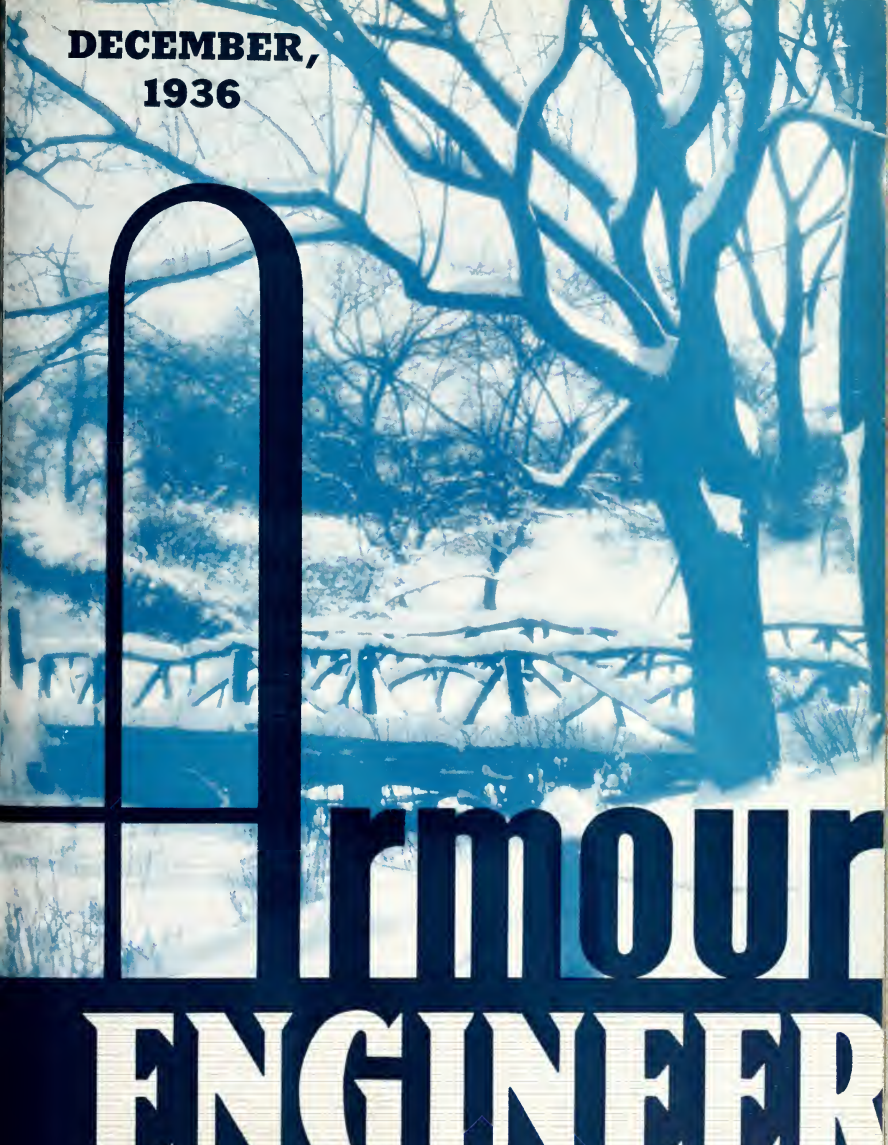

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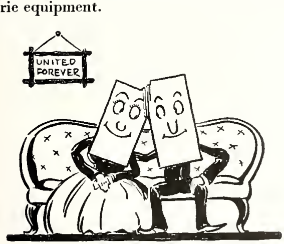
G-E *Campus News*

NUMBER 7000

JUST as if timed to take part in the 25th birthday celebration of the General Electric shops in Erie, Pa., Locomotive Number 7000 recently bowed its way out of its shed and took a brilliant turn on the test track.

The first of Number 7000's predecessors was begun in Erie in 1911, or just 25 years after electrical manufacture had commenced in Schenectady. Since that time locomotives weighing from 1½ to 300 tons have been turned out to improve haulage electrically. This range includes types for every sort of service—straight electric with trolley pole or third-rail shoe, battery types, internal-combustion engines, and combinations of different designs.

The Erie plant is notable for its contributions to practically every phase of modern electric transportation. The electrification of terminals and railroads has been accomplished largely with Erie equipment. Many of the new high-speed trains, which have aroused so much interest in rail travel, and many urban transit vehicles, such as street cars, trackless trolley coaches, and diesel-electric buses, likewise use Erie equipment.

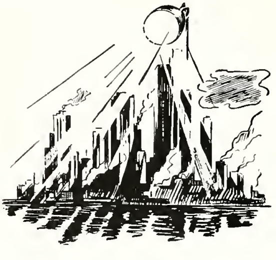


FIFTY YEARS OF WELDED BLISS

TWO pieces of metal were joined in "weldlock" fifty years ago. That was in 1886, when Professor Elihu Thomson, one of America's greatest pioneers in the field of electrical science and co-founder of the General Electric Company, invented resistance welding—fusing metals by placing them in contact and passing an electric current through them.

To mark the golden anniversary and to honor the man who officiated at the "ceremony," the Detroit Section of the American Welding Society dedicated a recent program to Professor Thomson's invention.

The years have seen resistance welding develop from its purely experimental stage into a process of metal fabrication that is wide in application. Metal radio and industrial tubes and parts, automobile bodies, the high-strength aluminum alloys used in aircraft, farm implements, the new lightweight railway equipment—all are fabricated by resistance welding.



SUNSHINE IN MANHATTAN

AT last there is sunshine—sunshine for those who spend so much of their hurried lives in the shadows of Manhattan's financial district. For in his new downtown recreation and health center—largest of its kind in the world—Artie McGovern, famous trainer and physical director, has equipped both the hot room and gymnasium with ultraviolet sunlamps.

Installed by General Electric engineers in the form of 26 ceiling units—probably the largest installation ever made in a single location—they not only afford health-giving artificial sunshine but are the sole means of illuminating the two rooms.

This installation marks another step forward in the field of lighting. The development of better lamps to sell at greatly reduced prices, the campaign for safety on the highway by means of improved highway lighting, the "Better Light—Better Sight" movement for the protection of eyesight, and the search for methods to improve general health have all been given strong impetus through the efforts of the General Electric Company.

96-340DH

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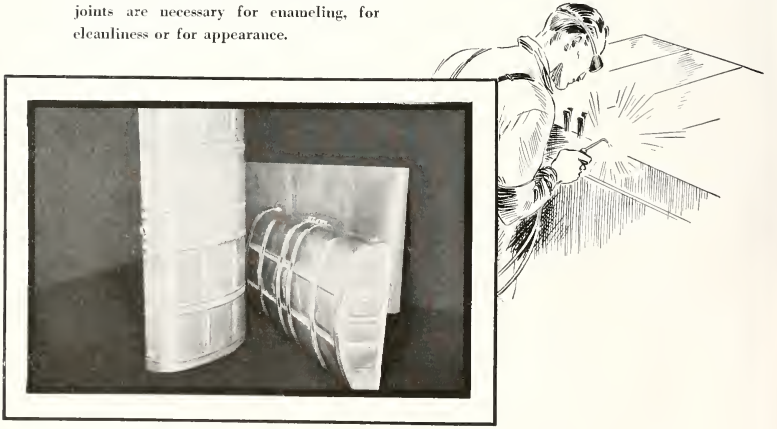

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JOHN GALSWORTHY, English author

"War is violent, it is distortionate, it is diseased; the negation of all harmony and all balance. The continuation of peace is the continuation of civilization."

W. CLYDE ALLEE, Professor of Zoology, University of Chicago

"There is no Christian way to kill a man."

H. G. WELLS, English author

"Civilization is a race between catastrophe and civilization."

WILL IRWIN, American author

"Modern warfare is nothing but mass murder controlled by well-developed science."

LOUIS L. MANN, Rabbi, Chicago Sinai Congregation

"God has nothing to do with the business of war."

VERA BRITTAIN, English author

"It is not by destroying, but only by living at peace with our neighbors that you and the civilization of which you are a part can hope to survive."

CHICAGO DAILY TIMES editorial

"War is that form of feeble-mindedness which now dignifies the butchery of innocent women and children by the term 'scientific.' National leaders pin medals on the chest of wholesale murderers and hang or shoot retail murderers."

JESUS

"Blessed are the peacemakers."

ARMOUR ENGINEER and ALUMNUS

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THE CONTRIBUTORS

■ *Ralph H. Rice* is Principal Assistant Engineer in charge of the work of the Board of Supervising Engineers, under which the City of Chicago and the street railway companies are partners. Mr. Rice received degrees from Armour Institute of Technology and from the University of Chicago.

■ *Thomas C. Poulter*, Second in Command and Senior Scientist in charge of the scientific program on the Byrd Antartic Expedition, 1935-36, is Director of the new Research Foundation. He received his Ph. D. from the Univ. of Chicago in 1933 and Sc. D. from Iowa Wesleyan in 1935. He served on the U. S. Submarine, C4, Panama, in 1918-19; he has been head of the department of physics and of chemistry, also head of the division of physical sciences, mathematics, and astronomy at Iowa Wesleyan College; and he was a Guggenheim Fellow in 1933-34. He is a member of the leading scientific societies.

■ *George J. Taylor* received his bachelor of science degree from A. I. T. and his master's from M. I. T. He is Commercial Engineer with the General Electric Vapor Lamp Co. of Hoboken, N. J.

■ *H. T. Heald* is Dean of the Institute.

■ *George Von Gehr,* Patent Attorney with Langner, Parry, Cord, and Langner of Chicago, graduated from Armour in electrical engineering and in law from John Marshall Law School with the degree of doctor of jurisprudence.

■ *D. P. Moreton,* professor in the department of Electrical Engineering, is secretary-treasurer of the Alumni Association.

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MODERN STREET CARS FOR CHICAGO

by Ralph H. Rice

IN 1929, the American Electric Railway Association (now the American Transit Association) formed a committee, known as the President's Conference Committee (P.C.C.), and provided a fund well over $500,000, to develop a modern street car. This Committee created a research group, with a well known research engineer as director, and work has been continuously carried forward upon the design of a car embodying many new features, and having the ability to compete successfully with automotive units. In this development the operating companies and the manufacturers of various parts of the car cooperated quite fully.

Probably the greatest public demand is for a reduction in the noise incidental to the operation of the cars. A modern appearance is also desired, with comfort while in a smooth riding, well lighted, heated, and ventilated vehicle. The modern car must also have a higher schedule speed than formerly. This requires the ability to maintain a higher speed and a rapid acceleration to hold its place in traffic. With increase in speed it is necessary to increase the braking power adequately so that there shall be no sacrifice of safety.

Economy in construction was an element to be considered, since the purchase of new cars would put a heavy burden upon the financial resources of the companies. Economy was sought by standardizing upon a design suitable for all companies, rather than having each company design its own equipment. By manufacturing a large number of cars, improving methods of manufacture, and using lighter weight material, additional savings were effected. An experimental car was built by the P.C.C. to test out new ideas and to discover desirable changes.

Details of the New Car

The Chicago Surface Lines, one of the leaders in this investigation, placed in service in 1934 two cars, from different manufacturers, which utilized the developments made up to that time by the P.C.C. These cars were in service to the "Century of Progress" and are still operating.

The new cars recently placed in service on the Madison street line contain the very latest developments of the P.C.C. as well as some changes made by the Chicago Surface Lines. There are now about 400 of the standard P.C.C. cars under contract for use in several cities.

The Chicago cars are somewhat longer and wider than the standard and have certain features which better adapt them to use here. The general structure of the body is the same, the trucks, motors and control, and braking features are the same as the standard P.C.C. car. The Chicago car is a single end, front entrance, center and rear exit, for two-man operation. Figure 1 is a view of the "step side" of the car and shows the three front entrance doors and the two center and the one rear exit doors. The overall length is 50'5", the width 8'9", and the height from rail to top of car is 10'1⅛". In appearance it is moderately streamlined, the apron below the floor line adding to this appearance and also hiding the trucks and equipment from view. The car complete, but unloaded, weighs about 35000 lbs., has a free running speed of 42 m.p.h., and a safe maximum speed of 50 m.p.h. Under ordinary service conditions, with eight stops per mile, the schedule speed should exceed 14 m.p.h.

The exterior is painted a Buckingham gray on the lower portion and ivory above. From the rail to the car floor there are three steps of 15", 8½" and 8½" with a 9" tread. The doors are operated pneumatically and are of the "blinker" type which swing and rotate at the same time, so that no part of the door, whether open or closed, projects beyond the sides of the car. The rear of the car is provided with markers and a stop light which operate from a storage battery.

Figure 2 is an interior view looking toward the rear. It shows the seating arrangement for 58 passengers, the wide aisle, the ample headroom, and the large loading space. The conductor's position is in the center. Passengers enter the front, fill the loading space, and pay their fare as they pass the conductor. They may leave by the center or rear door. The seats are leather covered and provide ample knee space. The register shown is of a new type and records five kinds of payment, with the accompaniment of a musical note and the illumination of the top of the register by a different color for each kind of payment. As one humorist said, it blushed a deep pink upon accepting three cents from a child.

The floor is level and a non-skid type throughout the length of the car. The windows have frames of stainless steel and are easily operated. The interior grills on the windows, the stanchions, the tubular framing of the seats, and in fact all the interior trimmings are of stainless steel. Heating is accomplished by drawing air through ducts, heating it by blowing it through a compartment containing the motor resistors and then venting it to the car interior through grilles just above the floor. The lighting of the car body is by 37 fixtures providing a directed illumination of high intensity. The fixture is designed to prevent any direct light being visible, and all glare is avoided.

The visible mechanism for operating the car consists of two levers which may be raised or lowered by the motorman. One controls the running of the car and the other the braking. In front of him there are a number of small switches which control the lighting, door operation, wind-shield wipers, and various other devices.

The Car Frame

The car bodies are being manufactured and the equipment assembled by the St. Louis Car Co. The "line" method of production is used, which is adopted from automobile assembly methods, and now used for the first time for street cars. Parts and equip-

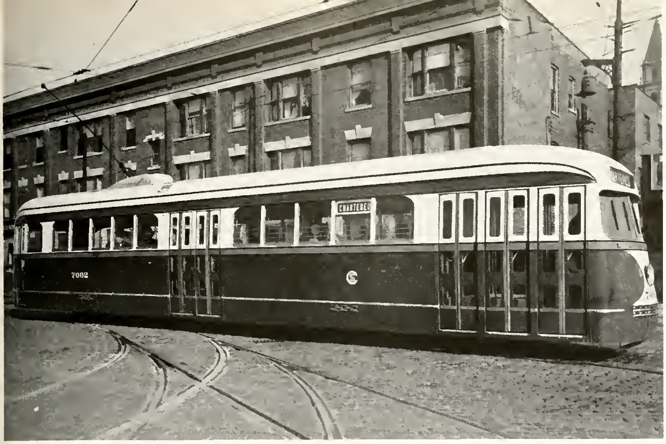


Fig. 1

Step side of the new car.

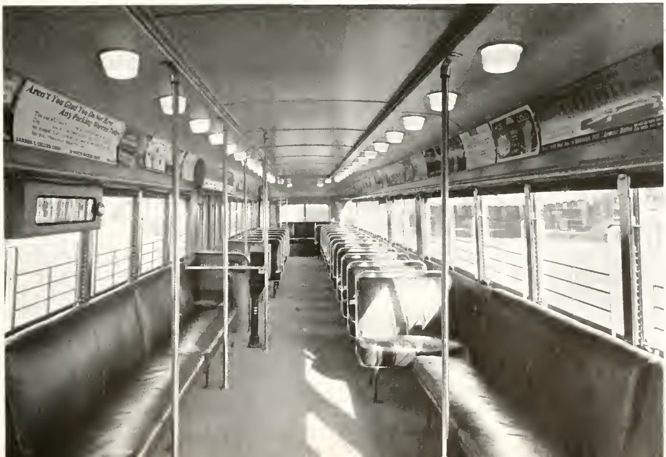
ment have been furnished by about forty manufacturers, and approximately seventy-five different contract items enter into the car. The frame of the car is of alloy steel, all welded into a single structural unit. Floor plates, side sheets, door and window frames, posts and carlines are all welded and become a part of the structure. Equipment supports and housings are, as far as possible, incorporated into the body framing. Connection between car body and each truck is by means of a single large diameter tube at each body bolster, which projects downward into a well in the truck. (See No. 4 in Fig. 3). These two tubes, or king pins, are the centers around which the trucks move with respect to the car body. This arrangement permits the horizontal forces moving the car to be applied only 11 inches above the rail and improves the riding quality of the car over older ones which have a high point of attachment between body and trucks.

The New Car Truck

The truck is one of the most revolutionary features of the new car. The general requirements were that vibrations and sound produced by the wheel or truck should not be transmitted to the car body, that no part of the truck should so vibrate under operating conditions as to produce an objectionable sound, that the parts should be interchangeable, require a minimum of servicing, and that as much as possible of the car weight should be spring borne. The truck now placed in service was built by the Clark Equipment Co. A view of this truck is shown in Figure 3. The truck frame is two tubular longitudinal members with cross members supporting the motors and other parts. The cross members and side frames are welded together. There are no steel springs—all being of rubber. Eight cylindrical springs are used—one behind and one in front of each journal. (See No. 3 in Fig. 3.) The outer housing of each spring is a part of the journal box casting. The inner part of the spring is a steel tube with its upper end welded to the tubular side frame. Between the inner and outer members of the spring

Fig. 2

Interior view looking toward the rear. . .



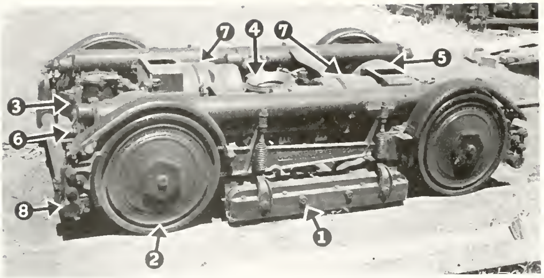


Fig. 3—One of the trucks, showing details.

four concentric cylindrical "sandwiches" are inserted. These sandwiches are rubber between two metal cylinders and vulcanized to the cylinders. The up and down motion between the inner and outer portions of the spring puts the rubber in shear, which produces an excellent cushioning effect. Hydraulic shock absorbers are shown at No. 6 in Fig. 3. These are used to dampen vibrations, and are connected between the ends of the truck side frame and the outer housing of the springs. The wheel is of the disc type, the web being a plate with the rim and flange attached. An inner face plate is welded to a hub pressed on the car axles. Between this inner plate and the web plate a flat "sandwich" is placed, outside of the web plate another sandwich, and then an outer face plate. A compression of 35000 lbs. is used to force the plates together, and finally a nut is put in place to hold the plates in position. (See No. 2 in Fig. 3.)

Operation

The operation of the motors is controlled, so far as the motorman is concerned, by the one control lever at his left hand. The acceleration and speed desired is secured by depressing this lever as required to produce the result. Likewise braking is secured at the desired rate by depressing the brake lever. The action from then on is entirely automatic in both cases. The depression of the control lever operates mechanically on a form of master controller which in turn initiates a sequence of operations in the electrical circuits which control the car motors. The sequence is in general the closing of a line switch energizing the motor circuits, then gradually cutting out resistance which is in series with the motor, and finally shunting the motor fields, such operations speeding up the motor to the desired amount and at the desired rate as fixed by the position of the control lever.

Both the General Electric Co. and the Westinghouse Co. have built equipments for these cars which carry out the above operations. The General Electric Co. has a "motor controller" which utilizes a stationary commutator with a revolving brush arm for cutting out sections of the accelerating resistance which are connected between the commutator segments. This brush arm is driven by a small air engine. The Westinghouse Co. uses an "accelerator" which is a group of contact fingers arranged around its circumference and having a roller arm which depresses the fingers as it rotates, pressing them against a bus bar and thus gradually cutting out the accelerating resistances which are connected between the finger contacts. This device is operated by a "pilot motor." One of these devices has 250 contacts and the other 99, so that no matter how rapid the action may be there is a very small increment of speed at each contact and consequently the acceleration is very smooth. After the car has reached its final speed the motor controller or accelerator remains in the same position during the subsequent running of the car. While the rate of change of acceleration is dependent upon the position of the control lever the maximum rate of acceleration has been fixed at 4.75 miles per hour per second. The rapidity with which the car gains speed is thus dependent upon the position of the control lever, but its final speed is independent of the time taken to reach that speed. The maximum acceleration and maximum speed are secured when the control lever is depressed as far as possible.

Equipment

There are additional items of equipment, such as a motor-generator, storage battery, air compressor, and blower, all of which are grouped with the control mechansm under the floor at the center of the car, and fully protected from dirt and water by covers. All wiring is enclosed in troughs or channels built into the car framing.

There are four 55 h.p. 300 volt high speed motors, which are operated, two permanently in series on the 600 volt line. These motors are mounted on the trucks as shown at No. 7 in Fig. 3 at right angles of the axles. Hypoid gears are used for the first time in street cars. (See No. 5 in Fig. 3.) The gear ratio is 7.17 to 1.00. These gears are a type of spiral bevel gear, and a life of about 750000 miles is claimed for them. (See No. 5 in Fig. 3.) Cooling air for the motors is taken in through an extension on the side of the car body bolster and passed through it by a flexible connection to an opening in the top of the motor case. This air is then blown through the motors by means of the armature fans.

The principal function of the motor-generator set is to supply 32 volt current for operating various control circuits and for dynamic and track braking. It runs continuously while the car is in service. The storage battery nominally floats on the motor-generator line and remains fully charged. The set is a 600 volt motor driving a 40 volt generator. The blower for heating and ventilating is attached to one end of the motor generator shaft. On the other end of the shaft is an air compressor for air brakes and door operation.

When it is desired to slow or stop the car the control lever is raised and the resistance is re-inserted in the motor circuit, thus shutting off the power partially or wholly as desired. The car will then coast. During coasting the motor controller or accelerator does not move to the off position but backward only until its position corresponds to the car speed, so that when it is desired to begin braking the proper resistor value for braking at that speed is set up.

Braking

Stopping the car is brought about by three sets of brakes which are automatically brought into action to an amount depending upon the depression of the brake lever which operates a brake controller. As in starting, the motorman can control the braking only by depressing the brake lever; the farther the lever is depressed the more rapid the braking. As the accelerating control is accomplished by cutting out resistors in series with the motor circuit and by shunting the

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THE RESEARCH FOUNDATION

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by Thomas C. Poulter

IN keeping with the reputation and scientific accomplishments of the faculty and alumni of Armour Institute of Technology, and after due consideration of the importance of the service to mankind that can be rendered by a coordinated effort in fundamental and industrial research, the Board of Trustees of Armour Institute at a special meeting on April 3, 1936 authorized its officers to take the necessary steps for the incorporation of a Research Foundation.

The Research Foundation officially started its first year in September with several projects already under way. Dr. Vasili I. Komarewsky was investigating chemical reactions involved in certain petroleum problems; Dr. R. D. Snow was making an extensive study of Illinois and Indiana coal and methods of treating them to reduce the sulphur and shale content; Prof. Donald E. Richardson was investigating the electrical characteristics of bethanized strand; Dr. Wm. A. Pearl was working on the development of a domestic stoker; and a great many other investigations had been conducted by Professors Philip C. Huntly and James C. Peebles.

The Research Foundation has the following officers: Willard E. Hotchkiss, President; Thomas C. Poulter, Executive Director; Charles W. Hills, Jr., Vice President; Robert B. Harper, Treasurer; C. Paul Parker, Secretary; and Joseph B. Finnegan, Assistant Secretary.

Purpose and Staff

This Research Foundation should not be confused with a commercial testing laboratory, and it is not our intention to compete in any way with such laboratories. The purpose of the Research Foundation is to conduct scientific research and development in the various branches of pure and applied science, and to this end, on October 8th, the Board of Directors of the Foundation appointed the following scientific staff:

In Mechanical Engineering, P. C. Huntly, Director of the Option, C. G. Anderson, E. S. Libby, H. L. Nachman, W. A. Pearl, J. C. Peebles, and D. Roesch.

In Electrical Engineering, E. H. Freeman, Director of the Option, D. P. Moreton, C. A. Nash, D. E. Richardson, and A. W. Sear.

In Civil Engineering, J. C. Penn, Director of the Option, H. T. Heald, and H. A. Vagtborg.

In Chemical Engineering, H. McCormack, Director of Option, A. H. Carpenter, B. B. Freud, O. A. Hougen, V. Komarewsky, J. J. Schommer, and R. D. Snow.

In Fire Protection Engineering J. B. Finnegan, Director of the Option.

In Physics, J. S. Thompson, Chairman, and W. W. Colvert. In Mechanics, C. E. Paul, Chairman. In Social Science, H. P. Dutton, Chairman.

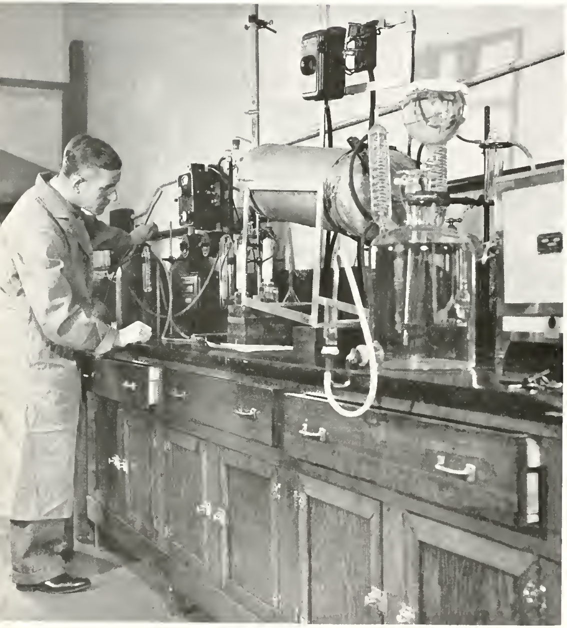
New Laboratories

We are announcing at this time, plans for the establishment of the following new laboratories, and work has already begun on most of them—A Filtration Laboratory, an X-Ray and Electron Diffraction Laboratory, a Spectroscopic Laboratory, a High-Pressure Laboratory, and an Instrument Shop. The *Filtration Laboratory* will be equipped with several different standard types of filtration equipment as well as special experimental laboratory equipment for development and fundamental research in filtration and allied problems.

The *X-Ray and Electron Diffraction Laboratory* will be equipped with the most modern General Electric X-Ray diffraction equipment with the necessary attachments for work on adsorbed films and crystaline analysis work. This laboratory will also contain the necessary equipment for electron diffraction work on, and physical examination of, adsorbed films. In addition to the regular dark room facilities there will be a microphotometer for measuring up the photographic plates.

A *Spectroscopic Laboratory* is under construction and will be equipped with a large Littrow type quartz

Spectrograph giving a dispersion of nearly thirty inches, and a recording Microphotometer which plots intensity of the spectral lines against wavelength. The wavelength scale for the visible spectrum can be magnified to as much as twenty-seven feet, making it possible to read wavelengths or shift of absorption bands very accurately. Another instrument in this laboratory will be a Zeiss gas-liquid Interferometer, by means of which direct readings of salt concentrations can be conveniently read to the fifth or sixth decimal place, and the constituents of gases can be read to a corresponding degree of accuracy. There will also be a dipping Refractometer for accurate determination of indices of Refraction, numerous types of light sources, and dark room facilities.



One of the special laboratories for research.

The *High Pressure Laboratory* will be equipped with a rather varied assortment of pressure equipment for studying electrical, physical, chemical, and optical properties of materials under pressure as high as 600,000 pounds per square inch, or even higher. This equipment has already been used successfully in a great deal of very interesting work. Some of the cylinders having glass or quartz windows have been used at pressures of as high as 580,000 pounds per square inch. Under these extreme pressures, colloidal constituents are precipitated, water compresses to half its volume, and changes to a solid, having a melting point of 212° F, or as high as the normal boiling point of water under atmospheric pressure. Glass or quartz a quarter of an inch in thickness will bend to a radius of curvature of four inches as many as ten times before breaking. Hydrogen will pass rapidly through the walls of a steel container, even though they are as much as three inches thick, and the structure of the steel is greatly affected, its tensile strength being reduced to less than half its former value. Under such extreme pressure conditions the molecules are not only brought closer together, but the atoms composing them are actually compressed by a considerable amount. Gaseous hydrogen can be compressed to half the volume that the same quantity of liquid hydrogen normally occupies. You may ask if such pressures as these are ever encountered i our everyday problems. Surprisin as it may seem, pressures of nearly half million pounds per square inc exist under such commonplace conditions as thrusting the point of a needl against a piece of glass, rubbing tw files together, or even a small fragment of meteoric material strikin something as soft as the earth's atmosphere. The penetration of hydroge through steel and its effect upon th structure of the steel causes more railroad rails to break than all othe sources of rail failure combined.

By means of high-pressure studies with the above mentioned equipment it has been shown that under the conditions existing in the normal operation of an automobile, lubricating oils and greases encounter conditions where the pressures are great enough to change these oils and greases to a solid which is harder than copper or even some grades of steel. This laboratory is therefore not a place to study conditions that occur only at great depths in the interior of the earth, but it gives us another tool with which to probe into some of the mysteries of some of our most commonplace and puzzling problems and makes it feasible to measure quantities in the laboratory which have never before been possible.

Instrument Shop

A Research Foundation without a well equipped Instrument Shop would be like a petroleum industry without a refinery. Our shop is nearing completion at the present time, and the equipment will immediately form the nucleus around which we hope to develop a shop that will meet our every requirement. This shop will be equipped with precision lathes, milling machines, shaper, grinding equipment, oxy-acetylene, arc and spot welding equipment, air-brushes, and ovens for various types of lacquer finishes, electro plating and glass blowing equipment. In addition to this there will be the necessary woodworking machinery for pattern and general instrument work. With such a shop we will be able efficiently to fulfil the needs of the Research Staff. The equipment of these laboratories will be available not only for the solution of Industrial Research Problems, but for fundamental research by Staff members and graduate students as well.

These laboratories and others which we contemplate establishing in the future will give the Research Foundation unusual facilities for the most modern approach to the solution of many industrial and fundamental research problems.

MODERN TRENDS IN LIGHTING WITH MERCURY LAMPS

by George J. Taylor

NUMEROUS slogans of "Man's Conquest of Nature" are frequently used in present day activities, but in general such phrases are merely idle boasts. In cases of great disasters such as earthquakes, floods, and fire hazards, man hastens helplessly to such shelter as may best suit his needs. Our power to defend oursleves from heat and cold are limited to definite conditions and accommodations, yet in our narrowed dugouts we boldly speak of "beating Nature at her own game."

In one particular science we have, however, gained sufficient ground actually to boast of successful achievements, as noted in the past, and what we know is to follow. It is hardly necessary to mention that this branch of science is "Light." To emphasize its importance we must only realize that darkness has been driven from our homes and factories, and is also being extinguished from the great outdoors. Streets and highways, landing fields for air transportation, automobiles, baseball and football fields, tennis courts, and many other resources are lighted for public convenience and comfort at night. Think what a handicap it would be to grope around by the "light of the moon" and how our social activities would be limited, to say nothing of a frightful existence and certainly a dangerous one.

Artificial Light Sources

Previous to the twentieth century there was but one kind of light in use for the regular purpose of illumination. Sunlight was the standard, and all artificial sources produced light of the same type, but varying somewhat in general effect. All these sources were of a highly complex nature, characterized by a continuous spectrum; the only difference between them was the comparatively slight variation in the relative amounts of the different colors contained. Artificial light was produced from glowing (incandescent) solids and contained all colors of the sunlight but with orange, yellow, and red rays in large proportion.

Early in the present century the development of a commercially practical method of producing light of a radically different type was developed. The source was a column of vaporized mercury in a long evacuated glass tube rather than a glowing (point source) solid. Lamps of this type are commonly known today as Cooper Hewitt lamps and emit a light characteristically different from daylight in that it is restricted to only a few colors. Cooper Hewitt mercury lamps, therefore, produce a light having over 90 percent of its rays (yellow-green) concentrated in the center portion of the visible spectrum, and the remainder in the blue-violet region. Mercury light is composed of practically all rays required for the specific purpose of seeing and is entirely free of wasteful heat and chemical rays, neither of which is needed for seeing. Inasmuch as mercury light is composed chiefly of yellow-green rays of light, it differs in appearance from daylight, which is white light or incandescent light, sometimes considered as white.

Three Classes of Lighting

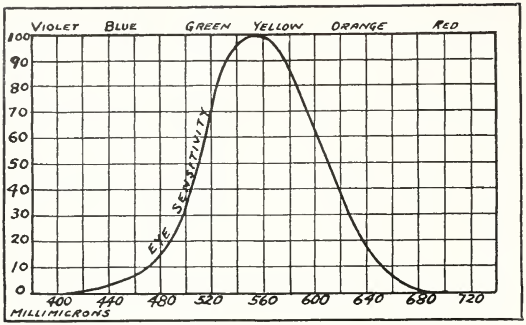
There are actually three classes of lighting that we use in our every day life, namely, social, commercial, and industrial. Industrial lighting includes all cases in which light is used in order to carry on manual labor; the main requisite is, therefore, a light possessing the quality of providing a high degree of visibility or power to see. Commercial lighting for stores, offices, display rooms, and similar localities normally should be of proper color quality and likewise possess good seeing value in order to show off materials to best advantage. Social lighting includes such places as home, decorative, and general interior lighting. With social lighting it is desirable to suppress or soften details as contrasted with industrial lighting, where all details must be revealed as sharply and clearly as possible.

The light of mercury-vapor has a revealing power that has been shown to surpass daylight. Fine details that can be discerned only with difficulty, or not at all, under continuous spectra light are very often readily distinguished under the simple light of mercury-vapor.

New 250 watt high intensity mercury vapor lamp.

Seeing Related in Terms of Quality of Light

Many people think of lighting in terms of mere illumination when in fact the most important consideration should relate to "seeing." Stop a mo-



Visibility curve showing eye sensitivity to various wave lengths or colors of visible light.

ment and think seriously about this. As you read this print, is there a tendency toward eye strain—are you subjecting your eyes to a condition of overburdening due to inadequate illumination or other factors pertaining to lighting? Remember, black print on white paper affords the greatest contrast and because of this, seeing conditions are made easier. If we darken the white paper background, seeing become increasingly more difficult, under the same lighting conditions, until print and paper are the same color when visibility no longer exists.

We see best when contrast between object and background is at a maximum. In industry contrast varies from almost nothing to practically 100 percent. Therefore, illumination must be supplied in certain intensities to satisfy the needs for proper vision. More important than mere intensity of light is the kind or quality of light applied. Seeing depends upon quality of light—it also depends upon quality of illumination, which is something entirely different.

Quality of illumination depends upon the type of lighting fixture used, spacing of a group of fixtures, distribution, and diffusion of light. It is a factor of a purely physical nature. Quality of light relates to the composition of light; it is much the same as quality of steel or cloth material. If one was to purchase steel for a certain purpose, a specific kind or quality would be specified rather than so many pounds or tons. Neither would we purchase silk simply by the yard if the best grade was desired. Naturally, a definite kind would be stipulated. And so it is with light. We have quality to consider as well as quantity. A ton of steel or a yard of cloth goods is a measure of quantity, just as the standard of lighting unit "foot-candle" happens to be a measure of quantity and in no way includes quality.

The human eye is indeed a very complicated mechanism as far as its construction and make-up are concerned. All rays of light do not produce equal visual sensations as denoted by the eye sensitivity curve. Some rays do not react upon the eye at all, others are transformed into heat which may inflame or irritate the eye, and finally those rays in the center portion of the spectrum provide normal, highly efficient visual sensations. Quality of light is, therefore, important in the process of seeing. Mercury light being composed chiefly of yellow-green rays, consequently, is especially desirable for factory lighting.

Lighting Efficiencies

Since the very inception of the incandescent lamp, remarkable developments have taken place. Every improvement in design, construction, and efficiency resulted in definite benefits to consumers, giving them more light at less cost. When one looks back to the first Edison lamp with its efficiency of about 1.5 lumens per watt and compares it with the present commercial Mazda lamp at 20 lumens per watt there is no question about the value of our research laboratories. The lighting profession, in particular, can be proud of its extraordinary record by successfully increasing the efficiency of incandescent lamps more than ten times the original value.

Today lighting scientists feel that the incandescent lamp has probably reached its peak of efficiency or light output per watt. Attention is being turned to some form of gaseous arc discharge. The entire world is experimenting with two commonly known arc discharge lamps, viz: sodium and mercury. With the sodium lamp, efficiencies in the order of more than 60 lumens per watt have been attained. The light emitted from sodium lamps is disinctly yellow. For this and other reasons it is not recommended for industrial lighting, but has a very wide field of application for outdoor lighting, such as highways, railway yards, and other large open spaces.

Type H Mercury Lamps

The Type H Mercury Lamp is the latest lighting development for industrial applications. Two sizes of lamps have been perfected. The 400-watt, Type H-1 lamp has an efficiency of 40 lumens per watt, while the 250-watt, Type H-2 lamp is rated at 30 lumens per watt. Both lamps have an average rated life of 2000 burning hours. Another size has been developed for projection service. It is an 85-watt, Type H-3, lamp, having an efficiency of 35 lumens per watt and a rated life of 500 hours.

It is evident from the ratings given that Type H lamps have a light output double that of incandescent lamps for the same wattage consumption. Because of the long life of the Type H-1 and H-2 lamps and improved efficiency, these lamps provide economical illumination for industrial and commercial areas. The Type H-3 lamp, developed primarily for projection service, provides light of a highly concentrated nature, and its life is somewhat longer than incandescent lamps used for this purpose.

Type H lamps have been available in this country for about two years, although development work was started many years ago. In spite of the short time these lamps have been released, a large number are already solving difficult lighting problems. The entire industry of American manufacturers is accepting these new lamps with more enthusiasm than any other lighting unit yet developed, not only because of the higher efficiencies, longer life, and simplicity of design, but for the more important factor of higher attainable levels of illumination required due to the advent of improved quality of merchandise and increased productivity.

Application of Type H Lamps

Mercury lamps are best suited to industrial areas where high levels of illumination are required. Lamps may be installed in four different manners:

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STUDENT PERSONNEL WORK

AT ARMOUR INSTITUTE OF TECHNOLOGY

By H. T. Heald, Dean

ALL extra-instructional activities carried on by a college, in which the personal development of the student is the primary objective, may be classified as personnel work. In recent years substantial progress has been made at Armour Institute of Technology in the development of a student personnel program, and the appointment of Dr. C. A. Tibbals as Assistant Dean, to have charge of all such activities, is another step in the general coordination of this work.

The first phase of the student personnel program occurs in pre-college counseling with high school seniors and prospective students who have evidenced some interest in engineering or architecture. This consists largely of providing these young men with information about the professions and in interpreting the Institute to them. Faculty members and alumni visit the high schools each year for this purpose, and several hundred young men, as well as their parents, visit the Institute for personal interviews with the admission officers. Although a large percentage of the students entering the Institute come on the recommendations of students and alumni who have been intimately acquainted with the work of the College, it is important to make sure that each applicant has a proper understanding of the vocational and educational objectives implied by enrollment in a course in engineering or architecture.

Admission Procedure

The admission procedure involves the evaluation of the student's application, which is presented in such a form as to contain adequate information about his high school work as well as some pertinent personal data. Where results of psychological or aptitude tests given in the high school are available, these are considered along with the student's high school record in determining his probable qualifications. In certain cases, notably where students are applying for admission to the Cooperative course, psychological examinations and mathematics tests are given at the Institute as an aid in determining the applicant's qualifications for admission.

It is extremely important that the entering student become oriented to his new surroundings as rapidly as possible, and to this end general meetings and group meetings of the new students are held during the registration period to familiarize them with the Institute and with school activities. In recent years a number of especially qualified junior and senior students have been asked to act as freshman group leaders to meet with the new men, in order to give them as rapidly as possible the student's point of view.

Standardized Tests

Beginning in 1936, all students are required to take a selected group of tests immediately after enrollment. consisting of the American Council on Education Psychological Examination, the Iowa Silent Reading Test, the Inglis Vocabulary Test, the Iowa Placement Examination (Mathematics Aptitude test), and the Cooperative General Science Test. This series of tests is designed to bring out the strengths and weaknesses of each student, and to serve as a basis for proper educational counsel. Students whose test scores indicated definite deficiencies in certain items in their preparation were offered an opportunity for remedial work in reading, classes in study habits being formed during the second semester of 1935-36. It is expected that such instruction will be made a definite part of the personnel program in the future.

The use of standardized tests also gives an opportunity to compare the abilities of students entering Armour with those entering other schools, and, increasingly as data accumulates, will serve as a basis for predicting probable success in the college course.

Faculty Counselors

Beginning with the class entering the Institute in September, 1936, all freshmen students are assigned to faculty counselors. These counselors are members of the faculty selected for their interest in, and qualifications for, this type of work, and each is expected to become personally acquainted with the students assigned to him. The faculty members serve as educational and vocational advisors

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and are expected to assist the student to obtain the maximum benefit from his college course. While a great deal of this type of counseling has been done in the past, and will continue to be done, on an informal basis by other members of the faculty, a systematic plan of counseling is necessary in order to make sure that the individual problems of every student have proper consideration. It is anticipated that the organized system for counseling will be extended, in the future, beyond the freshman year.

Student Activities

Another important phase of student personnel work at Armour Institute of Technology includes the general field of student activities, including athletics. Participation in these affairs is considered an important part of college education, and a wide range of interests is represented by the various organized groups on the campus. Student control of such activities and organizations is encouraged, and members of the faculty act only in an advisory capacity. Social fraternities, student government through the Armour Tech Student Association and through class organizations, student publications, music, dramatics, student branches of engineering societies, and honorary and professional fraternities all provide important recreational facilities as well as opportunities for personal development and training in leadership. Varsity athletic teams in baseball, basketball, track, wrestling, swimming, boxing, tennis, and golf occupy the attention of students of better-than-average athletic ability, while a constantly growing intramural sports program encourages and secures participation of a large percentage of the student body.

THETA XI

A
Merry Christmas
and a
Happy New Year
to All

from the active
members of
Alpha Gamma Chapter
of
Theta Xi

• • •

A cordial invitation is extended to all our friends to pay us a visit at 43 W. 33rd St., Chicago, Ill.

Financial Aid

No institution can properly provide for its students without adequate facilities for financial aid. Fifteen scholarships are awarded to freshman students at the Institute each year by way of competitive examinations. Scholarships are also available to students in Fire Protection Engineering, to sons of World War veterans through the LaVerne Noyes Estate, and to junior and senior students through endowed scholarships provided by friends of the Institute. There is great need of additional scholarships of this type, especially for sophomore students. Loan funds for Armour students are provided by the Alumni Association, the Henry Strong Foundation, the Faculty Club, and the Armour Tech Student Association. These funds, totaling several thousands of dollars, have generally proved adequate to meet the needs of junior and senior students, but additional funds which may be loaned to sophomores for repayment after graduation are needed.

Part-time employment makes it possible for a large number of Armour students to secure a college education. The Institute regularly employs thirty to forty men each year as student assistants for marking papers, clerical work, library assistants, and similar tasks. For the past three years Government funds have been available to provide limited part-time employment to about one hundred additional students. Numerous men work outside the School both during the year and in vacation periods, and without these opportunities many would be unable to attend college. It is an important duty of the personnel staff to help the student to maintain a proper balance between his program of study and his outside work obligations.

All students entering the Institute are given a physical examination by the Medical Advisor, who is in his office on the campus each day for consultation. Since a large percentage of Armour students live at home, no infirmary or hospitalization plan is maintained. The Medical Advisor

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WORLD-WIDE PATENT PROTECTION

by George Von Gehr

WITH the ever increasing growth of foreign trade, adequate patent protection for American inventions in foreign countries is of prime importance. American individuals and companies are among the most progressive in the world, and as a result many important inventions originate in this country. Failure to protect important inventions adequately in foreign countries usually results in the appearance of numerous cheap imitations. These cannot be eliminated or prevented unless the American manufacturer has taken the precaution properly to protect his invention in the foreign countries involved.

The purpose of this article is to indicate in a very general way some of the basic differences in the principal patent systems of the world. Frequently, when an invention is to be protected abroad, the question is asked whether an international patent protecting the invention can be obtained. There is no provision for the grant of international patents. Patent protection extends only within the boundaries of each country, and in many instances patent protection does not even extend to all of the colonies of a country.

There are approximately one hundred and fifty countries which grant patent protection, and for complete protection of an invention throughout the world, it would be necessary to obtain individual patents in each of these countries. Needless to say, even the most important inventions are rarely protected in every country of the world. In most instances, a sufficient measure of protection can be obtained by obtaining patents in the more important commercial countries.

International Convention

While there is no international patent, there is a treaty, known as the International Convention, of which more than forty countries, including the United States, are members, and which concerns itself with patents, utility models, industrial designs and models, trade marks, commercial names, and indications of origin, as well as the repression of unfair competition. The International Convention is a very remarkable treaty in that it has been in force in one form or another since 1883.

Under the International Convention, certain benefits flow to citizens of or companies located in the countries which are members. For the purposes of this article, we will consider this treaty only with respect to its effect on patents obtained in foreign countries.

One of the important benefits of the International Convention is that if patent applications are filed in foreign countries which are members of this treaty within twelve months from the filing date of the first United States application, the foreign patent applications will receive the benefit of the priority of the filing date of the United States application. That is, the United States applicant will be protected against any publication or use of the invention which may have taken place during the period between the filing date of the first United States application and the filing dates of the later foreign applications, and also against interim third party applications in the foreign countries involved. This protection is extremely valuable, particularly where an invention has been disclosed in technical publications or advertising literature shortly after the filing of the United States application, or has gone into public use in the United States or in foreign countries before the filing of the foreign applications. The importance of this provision of the Internal Convention will be apparent when it is appreciated that in most foreign countries the first applicant, and not necessarily the first inventor, is entitled to the grant of the patent.

Patent Systems

For the purposes of simplification I shall endeavor to classify the patent systems of the world. One general form of classification may be made according to the extent of the examination of applications for patents filed in the patent offices of the respective countries.

The French patent system is representative of one type, namely that in which there is no examination by the patent office as to the novelty or patentability of the invention to be protected. This is known as the "registration system." The French patent office, as well as the offices of many other countries which follow this system, merely examines a patent application as to formal requirements, and if these are complied with, a patent is granted automatically. In the French system, it is left to the Courts in the event of litigation to determine the scope of protection afforded. In this system the granting of a patent is a very simple and expedient matter, since there is no technical examination whatsoever, and the applicant incurs relatively small expense in obtaining a patent. The disadvantage is that the applicant has no indication as to whether the patent is valid or invalid, since a patent is granted for every application properly filed as to formal requirements.

The British patent system is typical of another general class, that is, from the standpoint of the extent of examination involved. In this system there is an examination from a technical point of view, but the examination is of a limited character. The British patent office examines applications only as to novelty, and not as to patentability or invention. In other words, if a construction, process, or product is new, a patent is generally

H. P. Dutton

A CONFERENCE COURSE IN PLANT ENGINEERING AND MAINTENANCE

A NEW development in adult education is to be initiated by Armour Institute commencing January 15, 1937. A group of operating executives, superintendents, factory managers, and plant engineers will be brought together for a weekly dinner and conference Friday night at the La Salle Hotel. Following the dinner they will listen to a talk on the management and maintenance of physical plant, by a man selected for outstanding achievement or special expertness in his special field. At the conclusion of the talk, an informal round-table discussion will be led by Professor Henry P. Dutton,* who is in charge of the course. In this round-table the speaker will be asked practical questions of the type that operating men meet daily. What can be done to secure the best heat utilization in a plant using process steam? How do you pay your maintenance inspectors? And so on for as long as the questions may continue. The speaker may have one answer; probably there will be half a dozen men in the group who have wrestled with and solved the same problem.

The meeting will resemble a trade or management conference more than a class, and it will do so for a definite reason. There are few firms which do not meet the problem of having to handle the mature operating executive who is too busy to keep himself fully informed of new developments in his field. Such men are beyond the need of drill in fundamentals and have little time for study. They are ill at ease among younger men in the class room. Yet they are as much in need as the younger man of new ideas, an exchange of experiences, and a stimulus to fresh enthusiasm and fresh points of view.

This conference series is the first of similar series, planned in various fields to meet the needs of the mature man well advanced in his profession. For such conferences an educational institution such as Armour has facilities and experience hardly available to even the largest company. The Institute can in particular do what very few single companies could do in taking the men out of their habitual environment to meet new faces, new points of view, and new problems of other companies.

Notable Speakers

Arrangements have been completed for a notable group of speakers, including such men as W. J. Austin, President of the Austin Company of Cleveland; H. P. Kendall, President of the Kendall Company, of Boston; Wm. S. Monroe, President of Sargent & Lundy, Chicago. Several Armour professors, and engineers, superintendents, and department heads from progressive firms all over the country are also scheduled to appear in a weekly program which will extend from January 15 to April 30.

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*Professor Dutton is Chairman of the Department of Social Science, Professor of Industrial Management, Consulting Editor, *Factory and Industrial Management*, Consultant in Management, and Director, Society for the Advancement of Management.

PATENT PROTECTION

(From page 15)

granted regardless of whether inventive skill was necessary to create the new construction, process, or product. Because the examination is limited only to the question of novelty, the obtaining of a patent is a relatively simple matter. The British patent system is typical of the systems in force in the dominions and colonies, with the exception of Canada. In this connection, it is interesting to note that the protection afforded extends only to Great Britain, Ireland (with the exception of Irish Free State), and the Isle of Man. A separate patent must be obtained for each of the dominions, Australia, Canada, India, New Zealand, and Union of South Africa, and for each of the numerous British colonies.

The United States and German patent systems are typical of those which require a very thorough examination of all applications, both as to the novelty and patentability of the invention. The German system requires perhaps a somewhat higher degree of inventive skill or patentability than that of the United States. Both systems are similar in that a very thorough examination is made by the respective patent officers; but they differ greatly in the procedure which is followed in obtaining a patent.

It is interesting to note that the Canadian patent system is the only one which is similar to ours, and that the systems of Argentina, Austria, Czecho-Slovakia, the Scandinavian countries, Holland, Hungary, Japan, and Poland, are like the German.

The Applicant

The important foreign systems differ from that of the United States as to who is entitled to apply for a patent. Here, as a general rule, the inventor is the only one who is entitled to apply. In practically all of the foreign countries, however, not only the inventor can apply for a patent but also the assignee (an individual or a company), either jointly with the inventor or without him. This greatly simplifies the application for patents, as the inventor is not always available, and in some instances the inventor is unwilling to execute such additional papers as may be necessary for the application for foreign patents. In these circumstances, it is possible for the assignee to proceed, as a rule, directly in his own name.

The proper time for filing a patent application in foreign countries is of great importance, in view of the fact that, generally speaking, the first applicant, and not necessarily the first inventor, is entitled to the patent. As previously stated, the International Convention provides for priority pro-

(Turn to page 22)

His job is to look for trouble before it happens. He is one of many who inspect telephone apparatus regulary, even when nothing is wrong. His work is called "preventive maintenance." ¶ This work is of the highest importance. It helps to prevent interruptions to the service; often forestalls costly repairs, or replacements; helps keep telephone service at highest efficiency. ¶ To plan this work requires management with imaginative foresight and the ability to balance the many factors involved in the maintenance problem.

BELL TELEPHONE SYSTEM

Tonight—call up someone in the old home town—after seven, when rates to most points are lowest.

WHAT 'S

DAD'S NIGHT

Date—December 19. ● Time—6:15 P. M. ● Place—Hutchinson Commons at the University of Chicago. ● Occasion—The inauguration of Armour's first Dad's Night. ● Program—Eight course dinner, sport's celebrity, and the annual Armour vs. University of Chicago basketball game. ● Those, gentle reader, are the bare facts. But if you will read between the lines, you will observe the abundance of fun and entertainment awaiting those who attend. The evening of December 19 is the night for you to be a pal with your dad. A night to feast and to be entertained by Armour's outstanding basketball game of the season. A night to meet one another's dads, and to form new friendships. Students bring your dads! Alumni bring your sons!

* * *

GIFT TO THE LIBRARY

Fifty volumes of U. S. Geological and Coast survey bulletins and reports were donated to Armour's library by Mrs. H. B. Alexander in memory of her husband who died in 1930. Mr. Alexander, a graduate of the University of Michigan, was a civil and mining engineer.

* * *

JAPANESE GUEST

Dr. Shinzo Koizuma, president of the Keiogijuko University of Tokyo, visited Armour recently as an honored guest. He attended the Harvard Tercentennial during the summer, and is now visiting prominent schools studying our educational system.

* * *

INTERCLASS BASKETBALL

Winning both their games by close scores, the seniors captured the interclass basketball title. They defeated the juniors, champions of the last two years, by the score of 9-7 in the first game, and the freshmen, who had decisively beaten the sophomores 21-8, in another close game, by the score of 13-11.

* * *

EXTRA! EXTRA! $1,000 PRIZE AWARD

As we go to press, announcement is made of an award of $1,000 to Charles H. and Arthur H. Schreiber, Arx '36 representing first prize in the national architectural competition for a small house sponsored by the Harnischfeger Corporation and conducted by the *Architectural Forum.*

CLASSES ELECT OFFICERS

Within the past month all of the classes except the freshman have elected their officers. Paul Martin was elected senior president; William Chelgren, junior president; and Edward Mitchell, sophomore president. The freshmen elected three men as temporary officers, postponing selection of their permanent officers until some time in the near future.

* * *

ARX BACCHANALE

On November 13, the Architects gave the first dance of the school year at the beautiful Diana Court. Five hundred guests enjoyed the evening.

* * *

SENIORS DANCE

The Senior Informal was held in the Gold Room of the Congress Hotel on Friday, Nov. 27. The success of the dance was indicated by the fact that it continued an hour longer than originally scheduled.

* * *

SOPHOMORE SMOKER

Another activity of Thanksgiving week was the sophomore smoker held at the Lawson "Y." A talk by John Schommer was the feature of this second annual affair, with swimming, ping pong, and other indoor sports occupying the remainder of the evening. Its success indicates permanency as an Armour social function.

* * *

ARMISTICE DAY ASSEMBLY

Colonel Edward A. Davis, retired, commander in charge of the Sixth Corps Area, was the Armistice Day speaker. His speech, an exceedingly interesting one about famous men he had known, was a radical departure from the usual Armistice Day address. The glee club and orchestra provided excellent musical entertainment.

* * *

ARMOUR PLAYERS PERFORM

On the Wednesday before Thanksgiving, the Armour Players, under the direction of Mr. W. B. Fulghum, presented "Waiting for Lefty," the first performance of the season. Outstanding among the players were Monte McConnell and Al Schreiber.

NEW FOUNDRY INSTRUCTOR

Mr. Alfred W. Kube, a graduate of Stout Institute at Menominee, has been appointed Instructor in Foundry. He has done extension work with the Univ. of Indiana and Gary College and has taught metal work seven years at Gary and one year at South Bend.

* * *

TOUCHBALL

Arousing more interest, perhaps, than has any other intramural sport, the touchball tournament was brought to completion when the senior chemicals, also last year's victors, defeated the junior mechanicals by a score of 14-8. So close was the play that an overtime period was necessary to decide the championship. The Chemicals finally recovered a fumbled pass from the Mechs' center to get the deciding six points.

About two hundred spectators saw the final game. This is, perhaps, the best proof of the fact that touch football has much of the appeal of the more strenuous game. The passing, running, kicking, and especially the blocking, were of such quality as to delight the heart of a true football fan. Touchball at Armour has accomplished much more than producing a championship team; it has aroused and created a school spirit which ought to help the varsity teams in their contests.

* * *

BASKETBALL SCHEDULE 1936-37

Dec. 3—De Kalb, here (Armour 29, De Kalb 25.)
Dec. 8—Arkansas, here.
Dec. 12—Lake Forest, there.
Dec. 15—Beloit, here.
Dec. 19—Chicago, there.
Jan. 5—Lake Forest, here.
Jan. 8—Beloit, there.
Jan. 15—Western State Teachers, there.
Jan. 19—Wheaton, here.
Jan. 22—Mich. State Normal, here.
Feb. 4—Mich. State Normal, there.
Feb. 6—Detroit University, there.
Feb. 9—North Central, here.
Feb. 19—Western State Teachers, here.
Feb. 20—North Central, there.

GOING ON

FRATERNITY NOTES

Alpha Chi Sigma, professional chemical fraternity, pledged fourteen new men in its regular fall pledging program. There were four from the sophomore class, seven from the junior class, and three from the seniors. ● The Armour chapter of *Chi Epsilon* held its twenty-sixth initiation in its fraternity rooms on Friday, December 11. Four seniors and two juniors were presented with their keys in the presence of active, alumni, and faculty members. The honored men were: M. Herz, M. S. Jaedtke, J. Smidl, and S. Taradash, seniors; F. Palonis and W. Schlax, juniors. An initiation banquet was held in the Student Union. As a climax to the evening the group adjourned to the Selwyn theater to see "Leaning on Letty." ● *Phi Lambda Upsilon,* honorary chemical fraternity, pledged seven men. They were N. K. Anderson '38, H. Bliss '37, F. D. Hoffert '37, R. M. Levy '37, W. R. Marshall '38, and W. F. Wagner '38.

Pledge dances have been frequent at many of the chapters. A pledge formal was held at *Delta Tau Delta* on November 30. ● *Sigma Alpha Mu's* pledge dance was made memorable by a novelty turtle derby.

The Mothers Club of *Pi Kappa Phi* held a card party on December 5. ● A tea, held by the Mothers Club of *Phi Pi Phi,* was given in honor of the pledges' mothers on Sunday, November 15. ● The *Delts* had a Mothers Tea on December 6.

The new chapter rooms of *Alpha Chi Sigma* in the apartments on 33rd St. are being decorated and remodeled. The majority of the chapter's members will be active participants in the joint meeting between the collegiate chapter and the local chapter of the A.I.Ch.E.

Sigma Alpha Mu held an enthusiastic alumni reunion, on November 30, in honor of their National Founders Day, a celebration of the fraternity's twenty-eighth anniversary. Many of the charter members of the Armour chapter were present. The evening featured movies, which were shown in the new chapter rooms in Chapin Hall. ● *Pi Kappa Phi* held their Founders Day Banquet on December 10 in conjunction with the active chapter and the alumni.

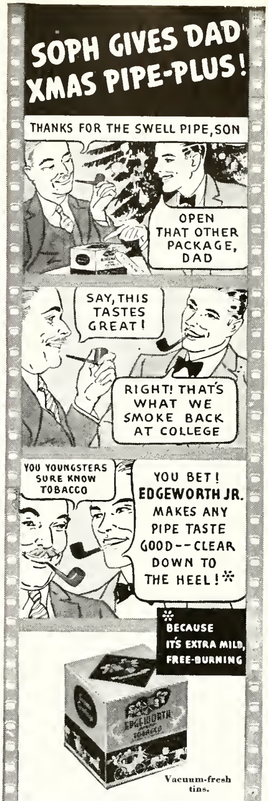
Numerous dances were held and are being planned at the various houses. The *Phi Pi's* held a radio dance on November 25. ● *Triangle* participated in a pledge dance on December 5. ● A Christmas dance is being planned by *Pi Kappa Phi.*

Purdue University will be the scene of *Chi Epsilon's* biannual conclave. The Armour chapter plans to attend the meeting practically *en masse,* with Lewis Zwissler, president of the active chapter, leading the delegates. ● A delegation from the *Delt* house is preparing to attend the divisional conference at Madison, Wisconsin. ● The district conference of *Pi Kappa Phi* was held at the University of Illinois during the week-end of December 10.

Two of the active members of the Triangle were pledged to *Phi Lambda Upsilon,* and one active and one pledge to *Alpha Chi Sigma.*

The first of a series of Fathers and Sons Banquets was held at the *Phi Pi Phi* house on November 18. ● An alumni Monte Carlo is being planned by the *Pi Kaps* for February.

Preparations are being made at the various houses for the interfraternity ping-pong and basketball tournaments. *Delta Tau Delta's* house ping-pong tournament is nearing completion in anticipation of the interfraternity competition. ● A similar tournament is being run off at *Sigma Alpha Mu.* ● The *Delts* as well as the *Triangle* men are showing interest in the coming interfraternity basketball tournament.


SOPH GIVES DAD XMAS PIPE-PLUS!
THANKS FOR THE SWELL PIPE, SON
OPEN THAT OTHER PACKAGE, DAD
SAY, THIS TASTES GREAT!
RIGHT! THAT'S WHAT WE SMOKE BACK AT COLLEGE
YOU YOUNGSTERS SURE KNOW TOBACCO
YOU BET! EDGEWORTH JR. MAKES ANY PIPE TASTE GOOD--CLEAR DOWN TO THE HEEL! *
* BECAUSE IT'S EXTRA MILD, FREE-BURNING
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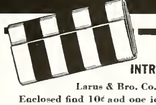
Vacuum-fresh tins.

TIMELY TIP: If dad's a steady pipe smoker, get him a special Xmas package of Edgeworth Ready-Rubbed or Plug Slice. If he smokes both a pipe and cigarettes, get him this laminated "Cellophane" Xmas package of Edgeworth Junior.

WHILE THEY LAST! $1.00 POUCH FOR 10¢

. . . and one inside white paraffin wrapper from a tin of Edgeworth Jr. We offer you this $1.00 English Type Folding Pouch in Rep Cloth with Rubberized Liner for only 10¢ and one wrapper to persuade you to try Edgeworth Jr. Buy a tin today. Send the inside wrapper and your dime together with this coupon (or print your name, college and address on the wrapper)—and we will send your pouch immediately. Only one to a customer.



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Air Velocity Meter
Instantaneous Direct Reading

No longer is it necessary to use complicated instruments and stop watches or make slow, mathematical calculations to obtain accurate velocity readings of irregular shaped or slotted grilles, velocity readings in ducts, or at inlet or outlet openings or other air velocity measurements.

Now you can do all this and more with the "Alnor" (Boyle System) Velometer, the instantaneous direct reading air velocity meter, and you can do it accurately, conveniently and quickly. You can obtain static, or total pressures, locate leaks and losses, detect drafts, or determine efficiency of fans, filters, blowers, and other equipment.

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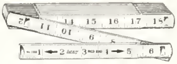

THE LUFKIN RULE CO.
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MODERN STREET CARS

(From page 8)

fields, so the braking is brought about by reversing this process, using the same mechanism controlled by the brake controller. The first braking action is dynamic which uses the motors as generators. The motors are disconnected from the line and become generators operated by the kinetic energy of the moving car. The motors are then short - circuited through resistors which absorb the energy, and produce heat. Air blown through these resistors is used to heat the car. The motor (now generator) fields are initially excited by a low voltage battery current, the generator pickup is certain and rapid, and any desired rate of braking can be secured. Because of this battery excitation the braking action is independent of any trolley connection.

The dynamic braking is dependent upon the motion of the car and as this diminishes in speed this method of braking becomes less effective. The second brake system, the magnetic track, then automatically comes into action. This brake system has shoes mounted between the wheels on both sides of both trucks, and all of these shoes are forced down on the rail by electro-magnets which are energized by the 32 volt battery current. (See No. 1 in Fig. 3.) As the car speed diminishes a larger part of the braking action is produced by these track brakes. This brake is also independent of any connection to the trolley wire and is also independent of rail conditions. The third system of braking is the ordinary air. Because of heat generated by friction of the brake shoe on the wheel tread, the air brake is not applicable to the new type of wheel as the rubber inserts insulate the wheel so that the heat cannot be dissipated as in the ordinary car. This brake comes into action only when the car speed has been reduced to about 4 or 5 miles per hour, and the magnetic brake is cut out. The air will also hold the car under brake application when standing. The air brake has four separate cylinders and lever systems, one for each axle. (See No. 8 in Fig. 3.) This does away with heavy and noisy brake rigging. In case of emergency the brake lever is depressed to its limit and this will bring all types of brakes into joint action, irrespective of speed, bringing the car to rest in minimum distance.

The car as it actually operates on the street has been found very quiet. This noiselessness, both inside and out, is probably one of the chief appeals to rider comfort. Attractive

TO ARMOUR'S ENGINEERS *from*
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Incomparable facilities for your social functions! Enjoy a distinction of unrivaled luxury at no extra tariff. Dances, fraternal affairs & banquets are arranged by our own expert catering staff.

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Stillicious
VITAMIN B* CHOCOLATE DRINK
*Obtained from Tasteless Yeast Powder

Order
from your
Dairy

Be Sure you get the genuine

appearance inside and out, comfortable seats, easy entrance and exit, ample lighting, smoothness of starting and stopping, and speed, all make a splendid contribution to the transportation facilities of the city.

STUDENT PERSONNEL

(From page 14)

does not undertake to treat serious illness, but refers the student to his family physician or other competent practitioner. In certain cases, where academic difficulties seem to be the result of physical deficiencies, the counsel of the Medical Advisor is sought in suggesting a remedy to the student.

Placement of Graduates

The final stage of the college personnel program comes with the placement of graduates in permanent positions, and in the proper maintenance of alumni contacts. The Placement Officer, who is also Assistant Registrar, maintains complete employment records for students and alumni, and cooperates with the faculty of each department in assisting graduates to obtain satisfactory employment. Personality ratings for all students are secured from the faculty during the senior year, and this information, together with the academic record and other personnel data already on file, permits a careful analysis of each graduate.

During the past year many more requests for graduates have come to the Institute from industry than it has been possible to satisfy, and since there are often demands for experienced men to fill excellent positions, alumni are urged to see that their experience records in the Placement Office files are always up-to-date. It is especially important for alumni to realize that the services of the Placement Office extend far beyond the securing of positions for those unemployed.

In conclusion, it may be said that the entire personnel program at Armour is designed to foster the individual development of the student. Certain phases of the work now in their early stages will undoubtedly be changed and improved as better methods are developed and experience is accumulated. No attempt is made to remove from the student the responsibility for solving his own problems, but it is believed that the systematic and understanding treatment of contacts outside the classroom will result in a better-rounded education and a fuller personal development for each graduate of the Institute.

Finer QUALITY

MEN'S SHOES

Smart styles—perfect fit and constant comfort. You will be proud of them, they have that $10 look and will give you miles of perfect service

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NONE HIGHER

Genuine Kangaroos, soft as a glove—tough as steel $4

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Two Loop Stores

134 No. State St. 125 So. Dearborn St.

and 25 Conveniently Located Neighborhood Stores

MERCURY LAMPS

(From page 12)

1. In every outlet as a complete mercury system.
2. On alternate outlets with Mazda lamps.
3. Combined with Mazda lamps in a common fixture.
4. Supplementary to an existing Mazda lamp system.

When Mercury lamps are combined with Mazda lamps, as indicated by the last three items above, the color quality of lighting will approach daylight conditions. In other words, mercury light is relatively rich in blue rays while incandescent light has a predominance of red rays and when the two sources are combined the resultant light approximates daylight, depending, of course, upon the lumen output of the two types of light.

Equal lumen output of mercury and incandescent provides a fine quality of light from a color standpoint. This may be used for commercial lighting, such as offices and schools. Where greater color correction and an even closer approximation to daylight is desired, incandescent light up to 1½ to 2 times that of mercury should be used.

Unfortunately, Mercury lamps do not fit into the home lighting field at this time. Possibly in the future some type of vapor lighting will be developed for this purpose. To those interested in improving their home lighting conditions, reference is made to newly developed floor and table lamps as approved by the Illuminating Engineering Society. Modern homes are being built with various forms of indirect lighting or, at least, with well balanced illumination throughout a room, whether it be living room, dining room, or kitchen.

After all is said and done, the main requisite of lighting, as far as general welfare is concerned, is for the purpose of seeing, with the possible exception of decorative lighting which is an entirely different phase. The time has come when light must be treated as a product of many grades of quality in much the same way as steel and cloth. A finer technique and deeper appreciation of lighting for the purpose of seeing will be required of our professional lighting experts, so that lighting equipment is properly chosen and installed to serve best the needs of industry.

PATENT PROTECTION

(From page 16)

vided the applications in the foreign countries are filed within one year from the filing date of the United States application. This priority applies, of course, only to those countries which are members of the International Convention. Some of the most important of these are Australia, Austria, Belgium, Brazil, Canada, Cuba, Czecho-Slovakia, Denmark, Finland, France, Germany, Great Britain, Holland, Hungary, Irish Free State, Italy, Japan, Mexico, New Zealand, Norway, Spain, Sweden, Switzerland, and the United States. Since these countries adhere to this treaty, it is always well to apply for foreign patents within one year from the filing of the first United States application.

In many instances the importance of an invention is not fully appreciated until more than a year has elapsed. In such cases it is still possible to obtain valid patent protection in foreign countries provided there has been no publication or use of the invention anywhere. Frequently, publication arises in the United States in trade journals and advertising literature, or by reason of the issuance of the United States patent, or the manufacture and sale of the invention, resulting in a public use. Such publication or public use would be a bar to obtaining valid patent protection in some of the important foreign countries. In practically every foreign country, the application for patent must be filed before there is a public use. The theory is that the invention has been dedicated to the public by reason of the public use, and no valid patent protection can be obtained in that country after such use.

In a limited number of countries, it is possible to obtain valid protection after the United States patent issues. These are known as Confirmation patents, for the reason that the United States patent is confirmed in the foreign countries involved. This type of patent is obtainable in most of the Central and South American countries.

Taxation of Patents

Taxation of patents is an interesting subject from an international point of view. In this respect, a United States patent is in an exceptionally advantageous position since the United States Government does not tax a patentee after the patent has been granted.

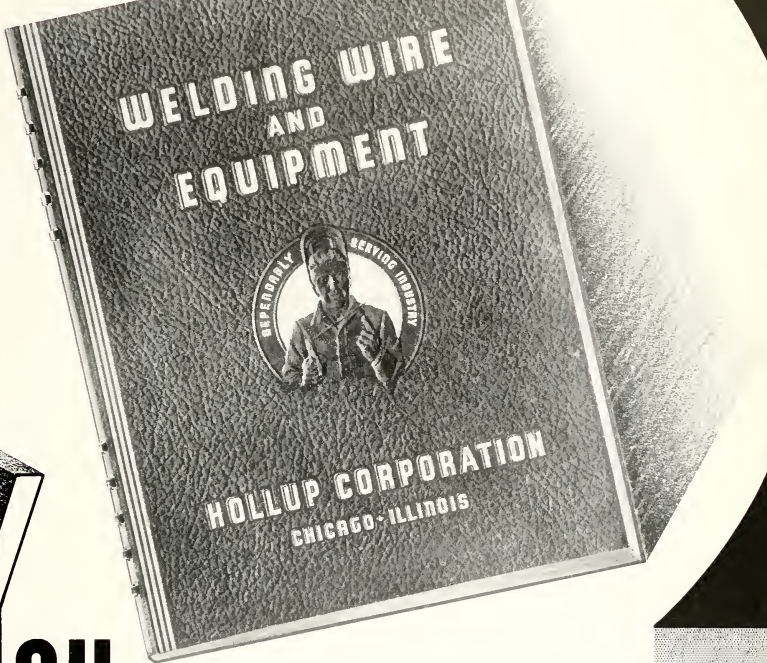
In foreign countries, the patent offices usually collect a tax periodically from the owner. Failure to pay this tax when due, or within a specified period thereafter, results in the lapsing of the patent. Patents lapsing for failure to pay taxes are usually irrevocably dead and cannot subsequently be reinstated. The taxation systems of the various patent offices differ with regard to the time when the payment of taxes commences. In some countries, France, Italy, Spain, Holland, and Belgium, a tax is collected each year beginning with the first year; in Germany, the third year; and in Great Britain, the fifth year. The purpose of commencing the payment of taxes at some specified time after the first year, that is, at the beginning of the third year or the fifth year, is to afford the patentee a sufficient period of time after the grant of the patent to ascertain whether it will be possible commercially to exploit the invention. If the invention is not successful within the first three or five years, it is not likely that it will be of subsequent value and, therefore, the patentee generally will not pay the taxes arising thereafter, thus permitting the patent to lapse. Alternatively, if the invention is being profitably exploited during the early years, the patentee will have no objection to the payment of the taxes assessed by the various foreign patent offices. The value of the taxation systems of the foreign patent offices is debatable since it greatly increases the expense to the patentee. On the other hand, it results in a greatly increased revenue for the patent office, a revenue which can be used for improving the system in that particular country. A further advantage is that unsuccessful paper patents usually are permitted to lapse during the early years, and, therefore, as time goes on, only the successful and important patents remain in force.

Manufacture of Patents

Some of the foreign laws include a requirement that patented inventions must be worked, that is, actually manufactured in the country in which the patent is obtained, in order to maintain the patent in force. There is no provision in the United States law requiring the manufacture of patented inventions. A United States patent will remain in force for its entire life of seventeen years even though the invention is never manufactured, used, or sold. In most of the foreign countries, until quite recently, it was required that the invention be manufactured in each of the countries in which a patent was obtained to a sufficient extent to meet the reasonable demands of the public, and failure to manufacture the invention rendered the patent subject to revocation. The purpose of this provision was to stimulate local industry. This provision placed a severe hardship upon a United States patentee since in most instances it was practically impossible for the United States patentee to manufacture the invention in each of the countries. But, recently, these provisions have been liberalized to the extent that if the patented invention is not manufactured in the foreign country, the patent is subject merely to the grant of compulsory licenses and not to revocation. The advantage of this is that if the patentee does not actually manufacture the patented invention in the foreign country, and if others desire to manufacture the invention, they may do so by applying for the grant of a compulsory license. If the patentee and the applicant for the license are not able to agree upon suitable terms, the foreign patent office will decide the terms of the license agreement, including the royalty to be paid to the patentee for the use of his invention. In this way, the patentee is compensated for the use of his invention by the payment of a reasonable royalty, and at the same time the public is not deprived of the use of the invention by the failure of the patentee to manufacture the invention.

CHRISTMAS
and
NEW YEAR'S
GREETINGS

R. B. Harper



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This book is also a complete catalogue of welding rods—a rod for every job in both electric and oxy-acetylene welding, welding equipment, brazing alloys, protective clothing, and accessories. A section is devoted to Electric Welding Machines.

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The book fully discusses the Hollup facilities,—the plant, the corps of engineers, metallurgists and master welders, the four laboratories, the fifty-two distributors and the Welding school.

Sixty-four Pages, 8½ x 11 Inches, 257 Illustrations, Leatherette Cover, Ring-Type Binding.

SEND FOR YOUR COPY TODA

Without obligation to me, please send the Hollup Reference Book.

.... (Name) (Title)

.... (Firm)

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HOLLUP CORPORATION *CHICAGO*

ALUMNI NEWS

by D. P. Morton, Sec'y.-Treas.

Letter from New Alumni Trustee

WISHNICK-TUMPEER, INC.
Chemicals-Oils-Pigments
195 Madison Ave. at 41st St.
New York

Office of The President,
October 27, 1936.

Mr. Alfred L. Eustice,
Secretary, Board of Trustees,
Chicago, Ill.

Dear Mr. Eustice:

I have for acknowledgment your telegram reading as follows:

"On recommendation Alumni Association Board of Trustees of Armour Institute of Technology at annual meeting yesterday unanimously elected you a trustee of the Institute. We look forward with pleasure to having you associated with us."

Permit me to assure you and the other members of the Board of Trustees that I feel highly honored and that I am prepared to put forth my best efforts in helping in any way I can.

I have always felt a deep sense of gratitude to Armour Tech for the opportunities afforded me when I attended school there, and I stand ready to repay this debt by doing what I can in helping the Board carry on its activities.

Yours very truly,

(Signed) *R. I. Wishnick.*

Alumni News

Personal items of general interest to your classmates will be appreciated, and we will do our best to build up the Alumni News section of the Engineer. When you return the post card, send along the latest information about yourself and your job. *Be sure to return the post card if you have not already done so.* Your cooperation in sending in this information is necessary if we are to publish an Alumni directory in the spring.

Visit Armour Tech

If you have an opportunity to visit Armour Tech, I am sure you will be very much surprised and pleased with the changes that have been made during the last year. You are welcome at any time, day or evening, and be sure to call at the Alumni office, second floor, main building.

* * *

Help! Help!

When you have finished with the *Armour Engineer and Alumnus,* pass it on to someone who may be interested in Armour Tech. Printed information will be mailed, upon request, to prospective students.

* * *

Alumni Clubs

There are a sufficient number of Armour Grads in certain cities and communities to form an Armour Club, and we will be more than glad to supply a list of names to interested groups. Groups are quite well organized in Milwaukee, New York, Indianapolis, St. Louis, etc. News about the activities of these groups will be appreciated.

Besides officiating at the Army-Notre Dame game, which was held in the Yankee Stadium November 24, Professor J. J. Schommer, president of the Armour Alumni Association, spoke before the New York branch of the association on football and the changes at Armour Tech.

* * *

No December Banquet

At a recent meeting of the officers of the Armour Institute Alumni Association, it was decided not to have an Alumni Banquet in December, but to concentrate our efforts on one next spring near the close of the school year. Complete information on this event will appear in the March and May issues of the *Armour Engineer and Alumnus.*

Life Membership

We are constantly in need of money for the student loan fund and appeal to you to buy a life membership in the Alumni Association which will cost you forty dollars ($40.00) and may be paid in one payment or four ten dollar ($10.00) payments. All money received for life memberships is placed in the loan fund and not one cent used for the general operating expense of the organization.

* * *

Patronize Our Advertisers

The *Armour Engineer and Alumnus* is made possible to a very great extent by the financial returns from the advertisements, and your kind consideration of this fact in making purchases will be appreciated.

* * *

List of Missing and Deceased

A real effort is being made to bring the files of the Armour Institute Alumni Association up to date. We are listing in this issue, for each class, the names of the graduates whose location appears to be unknown, and also the names of those marked deceased as shown on our records.

Your cooperation in checking these lists and the supplying of definite information or leads that will be helpful in correcting our records will be very much appreciated. May we have your help?

1897

We are informed by WILLIAM F. SIMS, E. E., that BERTRAND G. JAMISON, E. E., now resides in Paris, and may be reached at 4 Place de la Concorde, Paris. Mr. Jamison is foreign correspondent on the Electrical Equipment Committee of the Edison Electric Institute.

FREDERICK JOHNSON, M. E., lives at 1883 3rd St. N. W., Washington, D. C. He is with the Armstrong high school.

Recent word from FRANK D. SHEIBLEY, E. E., gives his home address at 460 Marlborough Road, Yonkers, N. Y., and his business address, c/o Consolidated Telegraph & Electrical Subway Co., 54-60 Lafayette St., N. Y.

MISSING:
Salamson, Max, E. E.
DECEASED:
Chapman, P. R., E. E.
Church, Edw. S., E. E.
Freeman, C. E., E. E.
Gaylord, T. P., E. E.
Malcomson, C. T., E. E.
O'Brien, E. D., E. E.
Richardson, E., E. E.

1898

DONALD MacKENZIE, E. E., is in the engineering dept. of Swift & Co., at the Union Stock Yards, Chicago. He has been with this company continuously since graduation. He resides at 7601 East End Ave., Chicago, Ill.

We have had no recent word from GEORGE E. MORRIS, Arch., but understand his home is in Elgin, Ill. and that he has an office there in the Sherwin Bldg.

ARMOUR INSTITUTE OF TECHNOLOGY

A College of Engineering, Architecture, and Science,
Founded in 1892 by Philip D. Armour,

Offers

FOUR YEAR COURSES, GRADUATE WORK, and EVENING CLASSES in

Mechanical Engineering, Electrical Engineering, Civil Engineering, Chemical Engineering, Fire Protection Engineering, Architecture, and Engineering Science.

Second Semester (Day Classes)
begins February 8, 1937

Spring Term (Evening Classes)
begins January 25, 1937

For information, write to
The Registrar

3305 FEDERAL ST. CHICAGO

CHARLES H. ROESCH, E. E., resides at 114 Wooten Ave., Chevy Chase P. O., Washington, D. C. and is associated with the Standard Engineering Co. at 2129 Eye St., N. W., Washington, D. C.

MISSING:
Weinsheimer, W. E., E. E.

DECEASED:
Blodgett, E. E., E. E.
Fairman, F. S., Arch.
Flanders, L. H., M. E.

1899

SIDNEY THOMAS COREY, E. E., resides at 7250 Harvard Ave., Chicago. He is with the C.R.I.&P. R.R. with offices in the La Salle St. Station.

CLARENCE L. TARBELL, M. E., is with the Waterloo Gasoline Engine Co., at Waterloo, Iowa.

Recent word from CHAUNCEY O. RANSOM, E. E., gives his home address as 3068 Euclid Heights Blvd., Cleveland Heights, Ohio. He is in the insurance business under the name of Ransom & Co., with offices at 830 Vincent Ave., Cleveland, Ohio.

SAMUEL C. FIDDYMENT, E. E., is a designer for Pettibone Mulliken Co., at 4710 W. Division St., Chicago. His home is at 1208 N. Laramie Ave., Chicago.

MISSING:
Matthews, W. D., E. E.
de Rimanoczy, B., E.E.
White, E. C., E. E.

DECEASED:
Bippus, S. E., E. E.

Goodhue, A. H., M. E.
Hanai, Geo. K., E. E.
Johnson, E. C., E. E.
Lewis, Chas. T., M. E.
Marienthal, O. B., Arch.
Powers, H. S., Arch.
Terry, O. N., M. E.
Warren, Wm., E. E.

1900

We have just received word from CHARLES H. FISCHER, E. E., residing at 333 Central Park West, New York, N. Y. He is a consulting engineer, with offices at 111 John St., New York, N. Y.

CHARLES SUMNER LONGBECKER, M. E., is Sec.-Treas. of the Three L's Electric Co., Traverse City, Mich.

MAX SKLOVSKY, E. E., M. E. 1911, is chief engineer for Deere & Co., at Moline, Ill.

Our records show that FREDERICK W. ZIMMERMAN, E. E., is an instructor in drawing at Lane Technical high school, Chicago.

MISSING:
Campbell, Mrs. M., C.E.
Martin, Robt. C., E. E.

DECEASED:
Bradley, L. C., M. E.
Creelman, A. T., E. E.

1901

CHARLES EDWARD EUSTICE, E. E., is superintendent of the Galena Mfg. Co., at Galena, Ill.

Recent word from WALTER IRVING LEWIS, M. E., states that he is president of the W. I. Lewis Co., 1206 Citizens Bldg., Cleveland, Ohio.

The last information we had on JOHN HENRY PARKER, E. E., gave his home address at 524 Hardy Ave., Kansas City, Mo., and his business connection with the Stanolind Pipe Line Co., in the same city.

WALTER RAYMOND RUEGNITZ, E. E., lives at 212 8th Ave., La Grange, Ill. He is in the insurance business at 175 W. Jackson Blvd., Chicago.

MISSING:
Arnold, M. H., E. E.
Baker, E. H., M. E.

DECEASED:
Bernhard, F. H., E. E.
Miller, W. E., E. E.
Parker, John H., E. E.

1902

ELIJAH LEWIS, E. E., lives at 1080 45th St., Des Moines, Iowa. He is proprietor of E. Lewis Sales Co., Manufacturer's Representatives, with offices at 300 Youngerman Bldg., Des Moines, Iowa.

A card from ROBERT G. REINIGER, M. E., informs that he resides at 1713 35th Ave., Seattle, Wash., and that he is Sec.-Treas. of the Globe Electric Co., at 307 1st Ave., South Seattle, Wash.

BENJAMIN F. EYER, E. E., is engaged in manufacturing, but he fails to state on the return card what he manufactures. His office is 226 Board of Trade Bldg., Kansas City, Mo.

MISSING:
Baird, M. F., E. E.
Benham, A. E., Arch.
Harwood, Ed. T., E. E.
Miller, Ivan D., C. E.
Wallace, E. L., E. E.

DECEASED:
Anderson, A. H., M. E.
Week, John E., E. E.

1903

A return card from WILLIAM M. BYRNE, M. E., says that he resides at 1549 St. Clair St., St. Paul, Minn., and that he is assistant in railway fire prevention conservation, Dept. of the Division of Forestry, for the State of Minnesota. He may be reached at 338 State Office Bldg., St. Paul, Minn.

WILLIAM CHARLES MATTHEWS, M. E., is proprietor of the Matthews Gas Machine Co., at 192 N. Clark St., Chicago.

WILLIAM S. TAUSSIG, E. E., now lives at 5121 Drexel Ave., Chicago. He is associated with the Visking Corp. at 6733 W. 65th St., Chicago. We quote a bit of news found on the return post card *"Taussig took unto himself a wife on May 22, 1936. Since he has considered taking this step for some thirty-three years, it goes to show a college education has its advantages. It helps you to make up your mind."* Best wishes.

MISSING:
Kaempfer, A., E. E.
Quien, E. L., Ch. E.
Stillson, H. G., E. E.
Weisskopf, M. J., C. E.

DECEASED:
Battey, F. V., E. E.
Edgecomb, E. E., M. E.
Kabateck, M. G., E. E.
Phillips, W. C. P., C.E.
Roos, E. S., E. E.
Shimizu, H., M. E.

1904

EARLE WALDO GROVER, E. E., is now superintendent of substations for the Commonwealth Edison Co., Chicago. We have had some very nice reports about results he is obtaining and wish him continued success.

ARTHUR M. JENS, E. E., F. P. E. 1920, is vice-president of FRED S. JAMES & CO., insurance agents and brokers, at 175 W. Jackson Blvd., Chicago.

GEORGE MANIERRE, M. E., resides in Milwaukee and is proprietor of the Manierre Engineering & Machinery Co., Milwaukee, Wis. We'd certainly appreciate a bit of news from the Milwaukee Alumni group.

MELVILLE S. FLINN, M. E., is a member of the firm of Flinn & Dreffein at 308 W. Washington St., Chicago, consulting engineers who specialize in industrial heating. Mr. Flinn resides in Highland Park, Ill.

MISSING:
Coy, Frank A., C. E.
Knapp, M. J., E. E.
Watt, J. M., M. E.

DECEASED:
Buie, Arthur, E. E.
Hamilton, H. L., M. E.
Hart, Harry A., C. E.
Silver, E. I., C. E.

1905

F. M. de BEERS, Ch. E., resides at 814 Grove St., Glencoe, Ill., and is owner of F. M. de Beers & Associates with offices at 20 N. Wacker Drive, Chicago. This company specializes in general engineering and sales work.

HERBERT A. DURR, M. E., resides at 200 Warwick Road, Kenilworth, Ill. He is president of H. A. Durr Co., mechanical engineers, at 123 W. Madison St., Chicago.

A return card from **RALPH HENRY FASH**, Ch. E., who lives at 2504 Oakland Blvd., Fort Worth, Texas, informs us that he is associated with the Fort Worth Laboratories at 828½ Monroe St., Fort Worth, Texas.

HENRY A. DREFFEIN, M. E., is the other handle of Flinn & Dreffein at 308 W. Washington St., Chicago, consulting engineers. (See Flinn, '04.) Mr. Dreffein resides at 741 Fair Oaks Ave., Oak Park, Ill.

MISSING:
Ash, Howard J., E. E.
Beamer, B. E., E. E.
Brackett, John C., E.E.
Goldsmith, F. R., M. E.
Harvey, W. F., C. E.
Stem, Le Vere H., Ch.E.
Thompson, J. K., Ch. E.
Tyler, Alva W., E. E.
Wright, M. E., E. E.

DECEASED:
Armstrong, J. R., E. E.
Croskey, Philip, E. E.
Marshall, H. B., E. E.
McBurney, E. Jr., M.E.
Whitney, Fred B., C.E.

1906

RAY E. SWEARINGEN, F. P. E., made the alumni office a brief visit on November 24th. He is engineer for the Continental Insurance Co., at 60 Sansome St., San Francisco, California, and resides at Mill Valley, Calif. We were mighty glad to see Swearingen and talk over old times, and can report to the other members of the class that he inquired about them all. We hope he will stir up some activities among the Armour Alumni on the west coast.

FRANK J. FLANAGAN, C. E., is with the City of Chicago and a member of the committee on finance, City Hall, Chicago.

MISSING:
Cook, Norman, Arch.
Cutler, Ed. W., E. E.
Edsen, N. L., M. E.
Kukawski, Ed. S., Arch.
Morrison, R. D., M. E.
Scott, P. J., M. E.
Wilson, Fred N., M. E.

DECEASED:
Carr, Alva L., M. E.
Meyer, E. D., E. E.
Reynolds, M. B., C. E.

1907

HAROLD W. JONES, Ch. E., whose address is 569 Sheridan Ave., Columbus, Ohio, is with the Columbus Pharmacal Co., 330 Oak St., Columbus, Ohio.

LEE B. JONES, E. E., resides at 6721 Paseo, Kansas City, Mo. He is president of the United Warehouse Co., with plants in both Kansas City, Mo. and Wichita, Kansas.

J. L. EHRETSMAN, M. E., is with the Illinois Engineering Co., at Racine Ave., and 21st St., Chicago.

WILLARD GILMORE, E. E., resides at 134 S. Ridgeland Ave., Oak Park, Ill. He is with the Link Belt Co., at 2410 W. 18th St., Chicago.

MISSING:
Badger, L. H., C. E.
Heinsen, Geo. M., C. E.
Kilgore, C. E., M. E.
Laubach, Geo. S., C. E.
Thompson, M., C. E.
Turnbull, Ira J., M. E.
Wolfe, Edw. J., E. E.
Young, L. B., C. E.

DECEASED:
Alling, C. R., F. P. E.
Campbell, E. E., E. E.
Davies, H. C., M. E.
Ellett, E. H. Jr., C. E.
Jackson, I. F., M. E.
Matt, Geo. L., E. E.
Smalley, J. S., E. E.
Stanton, G., Jr., C. E.
Williams, W., E. E.

1908

A card from **JAMES L. HACKETT**, C. E., informs us that he resides at 5201 Woodlawn Ave., Chicago, and that he is in the engineering dept. of the Sanitary District of Chicago, at 910 S. Michigan Ave., Chicago.

L. C. FRIEDLANDER, M. E., is secretary of the First United Finance Corp., at 215 W. Randolph St., Chicago, and lives at 5474 Everett Ave., Chicago.

ROY GEORGE GRANT, E. E., is with the General Electric Co., at 478 W. Canfield Ave., Detroit, Mich. His home address is 9324 Littlefield Ave., Detroit, Mich.

We are informed by card that **WILLIAM I. CONVERSE**, C. E., lives at 1020 Hillcroft Road, Glendale, Calif., and that he is treasurer of Horton & Converse at 621 W. Pisco St., Los Angeles, Calif.

JOSEPH E. MONAHAN, M. E., is proprietor of Joseph Monahan Co., sales agents for all kinds of machine tools, 321 Lake Michigan Drive, Grand Rapids, Mich. We hope he will be successful in forming an Armour Alumni Club in Grand Rapids.

MISSING:
Cahan, J., C. E.
Collins, F. C., E. E.
Cornwell, A. B., E. E.
Latta, Smith H., M. E.
Loofbourrow, J.D.,M.E.
Morey, C. R., E. E.
Morgan, C. W., M. E.
Winser, Roy A., Ch. E.
Zimmerman, S. L., C.E.

DECEASED:
Clausen, H. W., C. E.
Dittmar, A. A., C. E.
Eyers, W., F. P. E.
Johnson, A. R., E. E.
Lunak, S. E., Ch. E.
Matthei, H. R., C. E.
Nichols, H. W., E. E.
Oehne, T. C. Jr., E. E.
Thomson, F. L., F.P.E.
Vacek, V. F., E. E.

Armour Engineer and Alumnus,
Chicago, Illinois.

Gentlemen:

We are now entering upon a new year with every prospect that after a long period of anxious waiting the engineering profession is about to come into its own.

I hope and anticipate that all our old boys will so build that future generations will say with pride: "See what our forefathers built for us!"

May your Christmas be brighter and your New Year happier than they ever were before.

Sincerely yours,

D. F. Campbell.

160 North LaSalle St.,
Chicago, Illinois.

1909

ROBERT T. EVANS, M. E., is practicing architecture and general engineering. His home and business address are Jokake P. O., Phoenix, Ariz.

RUDOLPH WILLIAM JOHNSON, C. E., is assistant engineer at the Chicago Union Station Bldg., Chicago. His home address is 361 W. Windsor Ave., Lombard, Ill.

Recent word from **LAMOS KAHN**, E. E., informs us that he is a member of the firm of Herris Kahn Co., 8401 Buffalo Ave., Chicago. Mr. Kahn resides at 7850 S. Shore Drive, Chicago.

LOUIS NOYES BEXTEN, E. E., reports his home address as Route No. 6, Florence, Neb. Bexten is evidently making good use of his training at Armour Tech both in the class room and on the athletic field, as he is now teaching and, at the same time, holding down the position of coach at the Central high school, Omaha, Neb.

MISSING:
Anderson, H. C., C. E.
Binder, G. A., E. E.
Buckett, A. C., Arch.
Dick, Don. D., C. E.
Frisbie, Henry C., C. E.
Grassby, G. A. Jr., M.E.
Perrine, A. A., E. E.
Richards, T. E. Jr., C.E.
Von Gunten, O., Arch.

DECEASED:
Chatain, P. E., Ch. E.
Ebert, A. A., C. E.
Mayes, F. H., M. E.
Ostergren, H. N., E. E.
Simmons, L. E., E. E.
Spitzglass, J. M., 1909
Tregay, John, F. P. E.
Urson, F. J. Jr., C. E.

1910

HARRY W. CARLSON, M. E., 1101 Walnut St., Berkeley, Calif., is chief, Utah Loan Division, Federal Land Bank of Berkeley, at 15th & Clay Sts., Oakland, Calif.

ALFRED B. CHAPMAN JR., E. E., 2716 Burlingame Ave., Detroit, is with the Michigan Bell Telephone Co., at 1365 Cass Ave., Detroit, Mich.

ROBERT G. ELIEL, C. E., 1531 Post Ave., Rockford, Ill., is treasurer of Bradley Machinery Co., machine tool distributors and jobbers of cutting tools and supplies of all kinds, located at 406 Keshwaukee St., Rockford, Ill.

E. F. POHLMAN, Ch. E., is with the Peoples Gas Light & Coke Co., in charge of their research and testing laboratories, at 3921 S. Wabash Ave., Chicago. Mr. Pohlman resides at 5643 S. Honore St., Chicago.

VICTOR E. COLE, C. E., paid us a recent visit. He is a member of the firm, Hawes & Dodd, dealers in all kinds of tiles, 59 E. Adams St., Chicago, and resides at 6727 Cregier Ave., Chicago.

MISSING:
Crocker, A. H. Jr., M.E.
Gentry, T. E., M. E.
Leavell, R. A., M. E.
Moyses, Harry E., E. E.
Pearce, R. P., C. E.
Vynne, Eustace, C. E.
Williams, D., C. E.

DECEASED:
Deveney, W. J., C. E.
Kadic, Jos. F., E. E.
Munoz, Fredrico, C. E.
Richards, O. L., E. E.
Squair, F. R., Ch. E.
Wernick, F. E., M. E.
Young, Don. A., M. E.

1911

Recent word from **ALFRED C. LOHSE**, E. E., gives his residence as

A-B Specimen Cutting Machines
A-B Bakelite Presses
A-B Specimen Grinders
A-B Specimen Polishers
A-B Specimen Holders
Metallographic Microscopes of Bausch & Lomb, Leitz and Carl Zeiss

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All inquiries will have our close personal attention.

A new booklet describes this personalized technical service, "Metal Analyst," Volume 1, 1936.

ADOLPH I. BUEHLER
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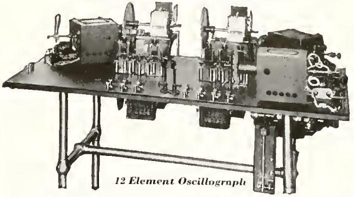
Adolph I. Buehler
OPTICAL INSTRUMENTS • METALLURGICAL APPARATUS



CAMBRIDGE INSTRUMENTS
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Physiological Instruments
and other Mechanical and Electrical Instruments

CAMBRIDGE
INSTRUMENT CO INC
3732 Grand Central Terminal, New York City

Long Beach, Michigan City, Ind. Mr. Lohse is with Pullman-Standard Car Mfg. Co., at Michigan City, Ind.

EMIL OLIN MANDLER, C. E., 3284 Wrightwood Ave., Chicago, is proprietor of Mandler's Laundry, at 464 Milwaukee Ave., Chicago.

MILTON F. DANIELS, F. P. E., is associated with the insurance firm of Rollins, Burdick, Hunter & Co., at 1937 Insurance Exchange, Chicago, Ill. Mr. Daniels lives at 723 N. Dunton St., Arlington Heights, Ill.

GERSON HERBERT EMIN, C. E., 1039 Hollywood Ave., Chicago, is a sales engineer for the W. A. Purvin Co., at 53 W. Jackson Blvd., Chicago.

HERBERT SIECK, Ch. E., Winnetka, Ill., is associated with Sieck and Drucker, Inc., chemical engineers, at 9 S. Clinton St., Chicago.

MISSING:
Cleaver, T. G., C. E.
De Tar, De Los, E. E.
Doering, R. C., F.P.E.
Emmons, G. C., E. E.
Gray, R. L., E. E.
Green, G. V., Ch. E.
Griffiths, F. H., M. E.
Pettibone, G. D., E. E.
Salomon, M. J., C. E.
Schmidt, E. J., E. E.
DECEASED:
Bradford, P. L., E. E.
Da Silva, C. J., C. E.
Kellner, O. R., C. E.
McCague, J. A., M. E.
Merriman, H. A., Arch.
Moore, W. W., Arch.
Tellin, Wm. G., E. E.

1912

ELMER LUCIUS CANMAN, M. E., is assistant engineer at the Underwriters Laboratory Inc., at 207 E. Ohio St., Chicago. He resides at 6430 N. Artesian Ave., Chicago.

CHARLES W. COLLINS, C. E., 1637 Ridge Ave., Evanston, Ill., is regional manager of the H.O.L.C. at 20 N. Wacker Drive, Chicago.

Our present records show HENRY CHARLES DORMITZER, Ch. E., with Wilson & Co., 4100 S. Ashland Ave., Chicago, and living at 9131 S. Leavitt St., Chicago.

PETER M. LEICHENKO, C. E., is a member of the firm, Leichenko & Essen, Architects and Builders, at 225 N. Michigan Ave., Chicago.

WALTER GEORGE MARTIN, E. E., is with the Curtis Lighting Inc., 1119 W. Jackson Blvd., Chicago.

HARRY E. NOREN, E. E., is in the testing dept., Public Service Co., of Northern Ill., 72 W. Adams St., Chicago, and his home is 1008 N. E. Ave., Oak Park, Ill.

MISSING:
Beach, W. E., C. E.
Curren, Earl L., C. E.
Enoshita, Toyozo, E.E.
Hazen, Fred G., E. E.
Kimball, N. F., M. E.
Legel, J. G., Arch.
Lewis, Geo. D., C. E.
Meade, G. R., E. E.
Neufeld, Ralph, C. E.
Strale, Nels W., M. E.
Yoshida, H. T., M. E.
DECEASED:
Bohlander, H. A., M.E.
Dewalt, E. V., Arch.
Hoehn, J. C., Ch. E.
Leviton, M. I., Arch.
Michael, J. C., Jr., E.E.
Peck, Winfield, M. E.

1913

JOHN T. AEBERLY, C. E., is chief of Division of Heating, Ventilating and Industrial Sanitation, Chicago Board of Health, Room 707, City Hall, Chicago.

ALBERT L. ARENBERG, E. E., of Green Bay Road, Highland Park, Ill. is president of Luminator Inc., and also Harrison Wholesale Co., located at 851 Washington Blvd., Chicago.

HOWARD COOPER, M. E., 250 Bronxville Road, Bronxville, N. Y. is with the Sinclair Refining Co., 630 5th Ave., N. Y.

PHILIP A. COPENHAVER, E. E., 4837 Kimbark Ave., Chicago, is with the Board of Trade, Chicago. We are constantly finding new uses for the engineering courses taught at Armour Tech.

RUDOLPH E. FISCHEL, E. E., is owner of Becker Bros. Carbon Co., N. Ashland Ave., Chicago, manufacturers of electrical and mechanical carbon products of all kinds.

MISSING:
Aip, W. B., E. E.
Connell, Daniel, Arch.
Cramer, A. C., C. E.
Drozeski, D. A., M. E.
Ermeling, R. W., Arch.
Fisher, H.F.(Isrl.),C.E.
Furay, C. J., Arch.
Garrison, C. W., C. E.
Kopald, Chas., E. E.
Kuehn, Hugo R., M. E.
Lill, A. C., C. E.
Moore, F. L., Ch. E.
Munn, W. K., Ch. E.
Newman, Irwin, M. E.
Rothwell, R. F., C. E.
Stanley, H. C., Arch.
Westlund, E. G., C. E.

DECEASED:
Arnold, C. H., F. P. E.
Curtis, Marston, E. E.
Kehr, Chas. F., M. E.
Leibrandt, C. R., C. E.

1914

RICHARD M. HEIM, E. E., 3227 Glengyle Ave., Cincinnati, Ohio is sales engineer for the Electrical Engineers Equipment Co., 701 Union Bldg., Cincinnati, O.

OLIVER A. DeCELLE, Ch. E., is with the International Filler Co., at 59 E. Van Buren St., Chicago.

HAROLD D. GUMPPER, M. E., is the man responsible for the development of the products of the Ready Power Co., 3820 Grand River Ave., Detroit, Mich. This company manufactures gas-electric units for electric industrial trucks and stationary engine-generator plants.

CLARK C. HERITAGE, Ch. E., is with the Oxford Paper Co., at Rumford, Me.

ALBERT FREDERICK HOLDEN, Jr., F. P. E., 172 Crest Road, Oswego, Ore., is superintendent of agencies, Springfield Fire & Marine Ins. Co., 632 Mead Bldg., Portland, Ore.

MISSING:
Agazin, Toly, Ch. E.
Auer, P. Fenton, C. E.
Barber, G. S., Arch.
Barr, Allen W., Arch.
Boetter, C. L., C. E.
Case, Harry L., E. E.
Cohen, Joseph, Arch.
Cooley, G. S., M. E.
Eliel, A. G., Arch.
Jeddy, Herb. E., C. E.
Kann, W. H., C. E.
Lesser, D. B., Ch. E.
Morrow, A. W., Arch.
Oldenburger, W.C., C.E.
Pomerene, Joel, C. E.
Roberts, W. F., C. E.
Sevin, Irv. M., C. E.
Shane, Jas. L., Arch.
Smith, H. F., C. E.
Swanson, F. A., E. E.

DECEASED:
Dean, Chas. A., C. E.
Emslie, John M., C. E.
Erickson, H. E., M. E.

1915

WALTER H. RIETZ, F. P. E., of Highland Park, Ill., is vice-president of the Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago.

FAYE NEIL COMPTON, C. E., 335 N. Louise St., Glendale, Calif., is in the structural engineers' office of the Pacific Electric Railway at 610 S. Main St., Los Angeles, Calif.

MORRIS GRODSKY, C. E., is with the Board of Education, Chicago.

ERNEST SIECK, Ch. E., is with Sieck & Drucker, at 9 S. Clinton St., Chicago.

HERBERT P. SHERWOOD, M. E., is a sales engineer for the Permutit Co., 210 S. Clark St., Chicago.

MISSING:
Bready, Wm. M., M.E.
Chamberlin, J.F.,F.P.E.
Deitenbeck, Max, C.E.
Harman, E. S., M. E.
Hirose, Yosh., Arch.
Hupp, O. R., E. E.
Johnson, V. E., C. E.
Mammes, H. A., E. E.
Mieczkowski, T.K., E.E.
Minchin, S. H., F. P. E.
Parrott, R. D., Ch. E.
Schiffers, E. A., Arch.
Shaffer, Sydney, E. E.
Stark, A. G., Arch.
Willson, H. E., M. E.
DECEASED:
Congdon, C. C., Ch. E.
Grossman, A. N., Ch.E.
Jultemeyer, W.L., M.E.
Norton, Jos. C., C. E.
Palmer, Robt. C., M. E.
Sproesser, G. W., C. E.
Wight, Clifford, M. E.

1916

JOHN R. Le VALLY, M. E., 1129 E. 45th St., Chicago, has the following business connections: vice-pres. of the Lincoln Engineering Co. of Ill., 2415 S. Michigan Ave., Chicago; and treas. of Faville-Le-Vally Corp., 140 S. Dearborn St., Chicago.

ERWIN EDELSTEIN, C. E., 5228 Drexel Ave., Chicago, is central district engineer, Water Pipe Extension Division, City of Chicago, at 2352 S. Ashland Ave., Chicago.

LEROY J. ENZLER, E. E., is now an ordained minister and teaching at Columbia College, Dubuque, Iowa. We wonder if he is making use of any of the courses he took at Armour Tech. A letter from him answering this question will be appreciated.

HENRY W. HEMPLE, C. E., is a hydrographic and geodetic engineer, U. S. Coast and Geodetic Survey, Washington, D. C.

MISSING:
Apfelbach, H. J., Arch.
Appelbaum, A., C. E.
Armstrong F. C. C. E.
Broman, J. G., M. E.
Eames, E. R., Arch.
Farrier, C. W., Arch.
Finkelstein, S. C.,Arch.
Foy, Edgar A., C. E.
Harris (Katz), H.S., E.E.
Kinnally, R. W., C. E.
McHugh, L. J., C. E.
Miller, Jos. V., M. E.
Newson, A. T., Arch.
O'Dea, T. M., Ind Arts
Shapiro H. M., E. E.
Smith, B. M., E. E.
Sosna, Sam. E., C. E.
Sostheim, B. B., C. E
Sullivan, Jos. E., C. E.
Wallbrecht, H.L., Arch.
DECEASED:
Dean, Stanley, C. E.
Echlin, E. S., M. E.
Hill, Claude, F. P. E.
Rook, Henry A., C. E.

1917

A. S. BENJAMIN, E. E., is in the sales dept. of the Teletype Corp., 1400 Wrightwood Ave., Chicago.

GEORGE W. CLOIDT, 5801 Dorchester Ave., Chicago, is a member of the firm of Cloidt-Gielow & Dudley, Insurance Agents, 175 W. Jackson Blvd., Chicago.

STEWART R. EVANS, Ch. E., is with the Central Scientific Co., 1700 Irving Park Blvd., Chicago.

HARRY M. GOODMAN, M. E., is with the Universal Oil Products Co., 310 S. Michigan Ave., Chicago.

We are informed that JAMES D. HARVEY, C. E., resides at 7742 Oglesby Ave., and that he is president of James D. Harvey & Co., Real Estate Investments, 10 S. La Salle St., Chicago.

MARK B. LEVINSON, Arch., 2019 N. Kedzie Blvd., is practicing architecture, with his office at the above address.

ARCH J. MEASE, Ch. E., Bonnie Brae, Utica, N. Y., is with E. I. du Pont de Nemours & Co., 61 Thomas St., New York city.

A recent letter from RICHARD F. DURANT, Ch. E., brings the information that he is in the high explosive division, E. I. du Pont de Nemours & Co., home office, Wilmington, Del. Durant is at their plant in Du Pont, Wash.

MISSING:
Bolte, Capt. C. L., Ch. E.
Cooper, Earl C., M. E.
Goldberg, L. I., C. E.
Hall, Ken. V., F. P. E.
Kendall, S. W., Ch. E.
Mellor, Lloyd E., Arch.
Morse, Ralph L., M. E.
Prochazka, R. V., E.E.
Schreibers, A. L., C. E.
Turner, J. W., Arch.
Vesely, Wm. J., Arch.
Zimmerman, A., E. E.
DECEASED:
Anderson, J. E., E. E.
Bechand, J. P., M. E.
Goorskey, N. J., Ch. E.
Hankan, W. M., Ch. E.

1918

K. A. TAYLOR, M. E., is with Fairbanks Morse & Co., at Beloit, Wis., and resides at 1521/2 Wisconsin Ave., Beloit.

JESSIE NITKA, C. E., 2320 Farwell Ave., Chicago, is with B. Kuppenheimer & Co., Inc., 415 Franklin St., Chicago.

DONALD E. CABLE, Ch. E., is at the General Laboratories of the U. S. Rubber Products, Inc., Passaic, N. J. His home address is 34 Addison Ave., Rutherford, N. J.

HERBERT W. PUSCHEL, F. P. E., is with the Home Insurance Co., of N. Y., at 744 Broad St., Newark, N. J., and lives at 197 Midland Ave., Montclair, N. J.

DAVID A. PAREIRA, Arch., 7716 Luella Ave., Chicago, is with the Chicago Art Marble Co., 2883 Hillock Ave., Chicago.

We understand that ORA MERLE HULLINGER, E. E., is manager of transformer sales for the Line Material Co., S. Milwaukee, Wis.

MISSING:
Andre, Guy L., M. E.
Durham, Edw. J., M.E.
Erickson, R. A., E. E.
Huffaker, N. L., M. E.
Kerr, Volney A., M. E.
Koehler, W. W., Ch. E.
Lewin, Edw. P., Arch.
Rusk, Ralph H., F.P.E.
DECEASED:
Newlander, R. A., E.E.

1919

EDWIN HENRY ARNOLD, E. E., is with the Western Electric Co., at the Kearny Works, 100 Central Ave., Kearny, N. J. His home address is 1060 Sleepyhollow Lane, Plainfield, N. J.

CLARENCE IVAN CARLSON, M. E., is an instructor in the East high school of Aurora, Ill., and lives at 628 Spring St., Aurora.

A card from JACOB ALMON KEETH, M. E., gives his home address, 805 Romany Road, Kansas City, Mo., and his business connection, Kansas City Power & Light Co., Kansas City, Mo.

FREDERICK ALLEN TRASK, F. P. E., is engineer for the Oil Insurance Association, 650 S. Spring St., Los Angeles, Calif. His home address is 673 S. Lomaine Blvd., Los Angeles, Calif.

We understand indirectly that ARMAND R. MONACO, Arch., has an office at 448 S. Hill St., Los Angeles, Calif., and that he resides at 3021 Waverly Drive, Los Angeles, Calif.

MISSING:
Cowles, F. S., Arch.
Dady, Wm. E., Arch.
Geldmeier, H. F., E. E.
Gold, Carl L., C. E.
Mintz, Chas. W., F.P.E.
Schimek, A. F., Arch.
Senescall, Clyde, C. E.
Wallace, M. R., Arch.
Wilbor, John B., Ch. E.
Wilson, M. M., Ch. E.
DECEASED:
Erickson, A. E., Arch.
Marks, Robt. E., M. E.

1920

HENRY F. KLEMM, Ch. E., 1417 Chetwynd Ave., Plainfield, N. J., is with the Bakelite Corp., River Road, Bound Brook, N. J.

THOMAS KINGSLEY, Jr., F. P. E., is with the Travelers Fire Insurance Co., 11th Floor Pierce Bldg., St. Louis, Mo. He lives at 215 N. Taylor Ave., Kirkwood, Mo.

LELAND KING CARDWELL, Arch., resides in Johnson City, Tenn., and is practicing architecture in the same city.

GEORGE E. PETERSON, M. E., is chairman of the dept. of physics at the Schurz high school, Chicago. His address is 10412 S. Talman Ave., Chicago.

We were recently informed that CONSTANTINE PASSIALIS, C. E. has a position as structural engineer and draftsman with the Ill. State Dept. of Arch. & Eng. at Springfield, Ill.

Beg your pardon. ALLEN Q. GRANT, E. E., is assistant principal at the Crane Technical high school, 2245 Jackson Blvd., Chicago, and is not at Harrison, as stated in the October issue.

IRA JAMES BREADY, M. E., is now district sales mgr. for The Permutit Co., 3316 Lambert Place, Cincinnati, Ohio. Congratulations, Bready, and continued success to you.

MISSING:
Bloomberg, S., E. E.
Faiostien, M., C. E.
Frank, Julian, C. E.
Karlson, Jos., Arch.
McEldowney, H.B., Arch.
O'Conner, W. J., Arch.
Peterson, H. C., M. E.
Podolsky, D. H., Ch. E.
Popkin, J. L., Arch.
Smely, Jas., E. E.
Sparling, D. C., Arch.
Stein, Aaron, C. E.
Stevers, H. D., E. E.
Wong, Yuk Man, M. E.
DECEASED:
Bentley, W. J., Ch. E.

1921

HARRY WILLIAM AHLBECK, Ch. E., is with the Bakelite Corp., at Bound Brook, N. J. His home address is R. F. D. No. 3, Somerville, N. J.

THOMAS L. ALBEE, E. E., is with the Western Electric Co., at the Kearny plant, 200 Central Ave., Kearny, N. J., and he lives at 621 Glen Ave., Westfield, N. J.

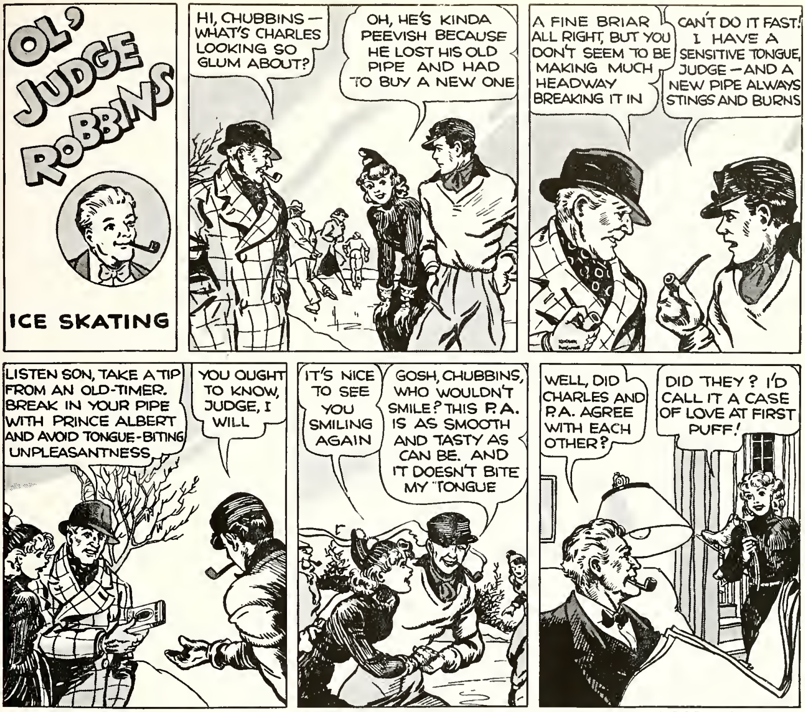
ROBERT W. VAN VALZAH, M. E., is inspector of naval material for the U. S. Government and is located in Room 1105, new P. O. Bldg., Chicago. He lives at 297 Northwood Road, Riverside, Ill.

RUDOLPH JAMES NEDVED, M. E., is a member of the Rudolph & Elizabeth Nedved, architects, with offices at 814 Tower Court, Chicago, Ill.

PHILIP E. BURNESS, Ind. Arts, is instructor in architecture at the Wright Junior College, Chicago, Ill.

A card brings the information that HERBERT F. SCHREIBER, E. E., is with the Electric Storage Battery Co., 129 S. Belmont Blvd., Kansas City, Mo., and resides at 3317 E. 30th St.

MISSING:
Bloom, Louis S., E. E.
Browde, A. M., Arch.
Kaplon, Hilton, Ch. E.
Mundt, Edw., C. E.
Muramoto, D. K., E. E.
Newman Dr. L.B., M.E.
Pearce, Wm. W., E. E.
Winiarsky, M.F., Arch.
Zahrobsky, G. J., E. E.
DECEASED:
Burke, S. J., C. E.
Ermeling, W., Ind.Arts
Grabendike, C. A., E.E.
Little, Jos. H., Ch. E.
Lyon, Wm. K., C. E.


OL' JUDGE ROBBINS
ICE SKATING
HI, CHUBBINS — WHAT'S CHARLES LOOKING SO GLUM ABOUT?
OH, HE'S KINDA PEEVISH BECAUSE HE LOST HIS OLD PIPE AND HAD TO BUY A NEW ONE
A FINE BRIAR ALL RIGHT, BUT YOU DON'T SEEM TO BE MAKING MUCH HEADWAY BREAKING IT IN
CAN'T DO IT FAST! I HAVE A SENSITIVE TONGUE, JUDGE — AND A NEW PIPE ALWAYS STINGS AND BURNS
LISTEN SON, TAKE A TIP FROM AN OLD-TIMER. BREAK IN YOUR PIPE WITH PRINCE ALBERT AND AVOID TONGUE-BITING UNPLEASANTNESS
YOU OUGHT TO KNOW, JUDGE, I WILL
IT'S NICE TO SEE YOU SMILING AGAIN
GOSH, CHUBBINS, WHO WOULDN'T SMILE? THIS P.A. IS AS SMOOTH AND TASTY AS CAN BE. AND IT DOESN'T BITE MY TONGUE
WELL, DID CHARLES AND P.A. AGREE WITH EACH OTHER?
DID THEY? I'D CALL IT A CASE OF LOVE AT FIRST PUFF!

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of
Automotive Clutches
6558 S. Menard Ave. Chicago, Ill.

1922

J. WARREN McCAFFREY, Ch. E., is an attorney at law, 111 W. Washington St., Chicago. He received his chemical engineering degree from Armour Tech. in 1925, attended the U. of Chicago for one year, and completed the legal course at Chicago Kent Law School, receiving the Bachelor of Law degree in 1930.

ROBERT P. BURNS, E. E., 3034 Leland Ave., Chicago, has supervision of the motion picture projection for the Publix Theaters, Chicago, Ill.

WILLIAM J. CHAPIN, M. E., is with the Braeburn Alloy Steel Corp., 531 S. Water St., Milwaukee, Wis. He resides at 2637 S. Shore Drive, Milwaukee.

ELMER F. DHUS, Ch. E., is with the Hammermill Paper Co., Hammermill Road, Erie, Pa.

OTTO KUEHN, M. E., is in the engineering dept. of the Standard Oil Co., 910 S. Michigan Ave., Chicago. Otto resides at 1258 Hood Ave., Chicago.

WIELAND W. OAKE, F. P. E., is with the Hartford Fire Insurance Co., at Appleton, Wis.

E. M. SEABURG, C. E., is with the U. S. Gypsum Co., 30 Rockefeller Plaza, N. Y. He lives at 17 Kenwood Road, Tenafly, N. J.

BRUNO Z. NOVAK, Ch. E., is with the Home Insurance Co. of N. Y., and is located at 253 Pierce Bldg., St. Louis, Mo.

MISSING:
Bernstein, Jacob, C. E.
Bradbury, G. V., M. E.
Conner, Geo. D., Arch.
Corydon, Jeff, Jr., M.E.
Davis, A. A., Jr., Ch.E.
Eierdam, E. C., C. E.
Erlandson, N. H., E. E.
Gambal, John J., C. E.
Herman, B. S., M. E.
Hochriem, F. G., E. E.
Mason, E. B., C. E.
McCormack, W.J.,Arch.
Paque, W. W., M. E.
Rehnquist, P. A., M. E.
Silverberg, S., Ch. E.
Watt, Jas. H., C. E.

DECEASED:
None.

1923

W. LINDSAY SUTER, Arch., is a professor in the dept. of architecture at Armour Tech. and a practicing architect with offices at 208 W. Adams St., Chicago. He resides at 329 Locust Road, Winnetka, Ill.

EMANUEL SKOLNICK, Ch. E., resides at 5047 N. Central Park Ave., Chicago. He is a ventilating engineer with the Board of Health, City of Chicago.

A card from WILLIAM J. TARRANT, M. E., states that he lives at 1138 Park Ave., River Forest, Ill., and that he is associated with the General Engineering Works, 4701 W. Division St., Chicago.

PAUL B. WEST, E. E., is with the Illinois Bell Telephone Co., 208 W. Washington St., Chicago. He lives at 506 S. Yale Ave., Villa Park, Ill.

HAROLD W. JOHNSON, C. E., is chief engineer for both the Greenlee Foundry Co., and the Northwestern Foundry Co., 662 W. Roosevelt Road, Chicago. His home is at 10119 Calumet Ave., Chicago.

RAYMOND O. WATSON, F. P. E., is with the Illinois Inspection Bureau, 309 W. Jackson Blvd., Chicago. He lives at 1122 Lake Ave., Wilmette, Ill.

JOHN B. LIZARS, M. E., is now a member of the firm of Hayward, Marechal, & Lizars, Attorneys, 60 E. 42nd St., New York, N. Y.

MISSING:
Bland, Henry, E. E.
Clark, A. S., Arch.
Crane, W. O., E. E.
Dolesh, F. J., E. E.
Downs, F. C., Ch. E.
Fisher, R. D., E. E.
Goldberg, D. B., C. E.
Goldstein, A., M. E.
Mandel, D. M., C. E.
Miller, D. F., E. E.
Oboler, Max O., E. E.
O'Brien, Wm. H., C. E.
Pollan, H. T., M. E.
Rutishauser, D. E., M. E.
Schwartz, M. L., E. E.
Sommers, L. H., Arch.

DECEASED:
Mills, Paul R., M. E.

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1924

KALMAN STEINER, Ch. E., is with the Consumers Petroleum Co., 1725 W. 31st St., Chicago, and resides at 5337 Kimbark Ave., Chicago. Steiner has completed the manuscript for a book to be published by the McGraw Hill Book Co., on "Fuel and Oil Burners."

JAMES M. PARKER, Ch. E., is a patent attorney located at 201 N. Wells St., Chicago. He resides at 195½ Humbolt Blvd., Chicago.

E. F. SISSON, F. P. E., is chief engineer for Newport Industries, Inc., Pensacola, Fla., and resides at 700 W. Moreno St., Pensacola.

JOSEPH R. KOBERLING, Arch., resides at 569 S. Peoria Ave., Tulsa, Okla. He is a practicing architect at the same address.

HENRY GEORGE VORSHEIM, Jr., Ch. E., is pastor of Central Presbyterian Church, Portsmouth, Ohio. He may be reached at 1210 17th St., Portsmouth, O.

WILLIAM B. BLAUFUSS, M. E., is with the American Potash and Chemical Corp., at Trona, Calif.

CLAIR L. KEENE, E. E., is with the Ocean Accident and Guarantee Corp., 1 Park Ave., N. Y. City. He resides at 178-23 Leslie Road, St. Albans, N. Y.

G. C. KINSMAN, M. E., is division sales mgr. for the Florida Power & Light Co., Miami, Fla. He resides at 1215 Country Club Prado, Coral Gables, Fla.

JOHN LEE WALSH, M. E., paid us a visit a few days ago. Walsh is general mgr. of the May Oil Burner Corp., Baltimore, Mr.

MISSING:
Anderson, H. E., Arch.
Baim, Eugene, Ch. E.
Bensinger, E. A., Ch.E.
Brown, M. L., C. E.
Cohn, Jas. W., E. E.
Falconer, J. W., E. E.
Faro, Robt. V., Arch.
Friedman, H. C., C. E.
Greenfield, T.(Is.),Ch.E.
Hardwicke, L. C., C. E.
Hart, Thos. H., E. E.
Johnson, E. A., Arch.
Lipsky, Wm. S., M. E.
Lowe, Budolph, M. E.
Marco, Fred J., E. E.
Murner, H. K., C. E.
Nelson, Carl A., M. E.
Samuels, Saul, C. E.
Solomon, Harry, C. E.
Swanson, E.J., Ind.Arts
Vickers, Wm. H., M.E.
Walk, Edw., C. E.

DECEASED:
Almendinger, H.A., E.E.
Finkelstien, L. M., E.E.
Heller, Duane L., M.E.

1925

S. ALAN BAIRD, M. E., is a consulting engineer, specializing in heating, ventilating, and plumbing, with offices at 621 Commercial Merchants National Bank Bldg., Peoria, Ill. He resides at 911 E. Virginia Ave., Peoria.

WILLIAM F. DESMOND, D. E., is a patent atttorney with the firm of Lee J. Gary, 38 S. Dearborn St., Chicago. Desmond lives at 1039 Forest Ave., Oak Park, Ill.

LOUIS S. GREEN, F. P. E., is with the Mo. Inspection Bureau, 1201 Gloyd Bldg., Kansas City, Mo. He lives at 426 W. 46th St. Terrace, Kansas City, Mo.

CARL A. HOFFMAN, Ind. Arts, lives at 5806 N. Artesian Ave., Chicago. He is head of the machine shop dept. at Lane Technical high school.

E. STANLEY LARSON, E. E., is in the engineering dept. of the Teletype Corp., 1400 Wrightwood Ave., Chicago. His home address is 6214 Winthrop Ave., Chicago.

EUGENE ODENWALDT, M. E., is with the U. S. Gypsum Co., at N. Tonawanda, N. Y. He lives at 117 Enola Ave., Kenmore, N. Y.

WALTER HENRY WEINWURM, Ch. E., is floor foreman in the heat-treat-

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Beck, M. D., Ch. E.
Gaylord, R. P., F. P. E.
Johnson, J. G., Ch. E.
Larkin, Clif. E., E. E.
Latta, Lynn M., F.P.E.
McCauley, W. J., Arch.
McFaul, Don. J., M. E.
Nicolai, A. E., Arch.
Norton, H. E., Ch. E.
Nudelman, C. S., C. E.
Ostland, R. E., C. E.
Prendergast,R.W..Arch.
Rose, Geo., Jr., M. E.
Schwarz, Edwin, E. E.
Stahl, J. K., M. E.

DECEASED:
Gaul, Carl C., C. E.
Taylor, Von D., F.P.E.

1926

EARL RAYMOND HUBBELL, F. P. E., resides at 25841 Pembroke Road, Huntington Woods, Royal Oak, Mich. He is state agent for the Royal-Liverpool Group of Insurance Companies, 2341 National Bank Bldg., Detroit, Mich.

A recent card from SAMUEL F. HENDERSON, E. E., informs us that he is a design engineer for the Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., and that his home address is Sherman Ave., Irwin, Pa.

EVERETT A. COOPER, F. P. E., 626 Acacia St., San Gabriel, Calif., is an insurance agent, 21 S. Garfield Ave., Alhambra, Calif.

EBERHARD ERNEST WETTLEY, M. E., is in business for himself as a patent engineer and patent attorney, 1642 Monadnock Block, Chicago. His home address is 4256 N. Kedvale Ave., Chicago.

BERNARD H. SCHENK, Ch. E., is area supervisor for the Visking Corp., 6733 W. 65th St., Chicago. His residence address is 1332 Johnson Ave., Western Springs, Ill.

EDWARD J. POSSELT, E. E., is in the engineering dept. of the Cutler Hammer Inc., Milwaukee, Wis., and resides at 709 E. Sylvia Ave., Whitefish Bay, Wis.

VINCENT VISCARIELLO, Arch., is an architectural designer for the Chicago Park District, Burnham Park, Chicago.

EDWIN A. JANSSEN, C. E., is in the engineering dept. of the Sanitary District of Chicago, 910 S. Michigan Ave., Chicago.

MISSING:
Armit, Edw. A., Ch. E.
Baird, W. M., Arch.
Becker, Geo., Arch.
Blume, L. J., Arch.
Gambell, C. H., M. E.
Harris, H. M., F. P. E.
Kleer, Chas. G., Arch.
Kornacker, F. J., C. E.
McLaren, S.J., Jr., F.P.E.
Melby, G. O., C. E.
Meyer, F. K., Ch. E.
Reeder, C. D., E. E.
Stiehl, D. R., M. E.
Zukowski, V. J., C. E.

DECEASED:
Chatroop, L. W., C. E.
Norrgard, E. G., M. E.
Ruddock, R. D., C. E.

1927

TRUMAN C. BUSS, Arch., is head of the Architectural Drawing Dept. of the Pullman Free School of Manual Training, 250 E. 111th St., Chicago.

MAURICE BRITAIN ROTHROCK, F. P. E., is with the firm of Boit, Dalton, Church, & Hamilton, Beacon St., Brookline, Mass.

CHARLES W. SCHRAMM, E. E., lives at 251 High St., Nutley N. J. He is with the Bell Telephone Laboratories, 463 West St., New York, N. Y.

HERBERT KOHN, Ch. E., is with the Savoy Drug & Chemical Co., 16 S. Peoria St., and he lives at 6822 Sheridan Road, Chicago.

WALTER T. COLLINS, C. E., is a junior civil engineer with the Sanitary District of Chicago, 910 S. Michigan Ave., Chicago.

WILLARD C. RYKERT, E. E., is with the Chicago Rivet & Machine Co., 1830 S. 54th Ave., Chicago. He resides at 136 S. Grant St., Hinsdale, Ill.

LESTER O. CASTLE, F. P. E., is with

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Barfield, N. D., Arch.
Berkson, Aaron, Arch.
Davidson, D. B., F.P.E.
Emerson, R. W., Arch.
Fraser, C. C., M. E.
George, H. R., Jr.,M.E.
Gothard, Wm. W., C.E.
Hall, Perry C., E. E.
Heinrich, B. L., M. E.
Heyes, A. B., E. E.
Johnson, L. F., C. E.
Jung, Carl L., M. E.
Knapp, John L., M. E.
Koeper, J. J., C. E.
Larson, E. A., E. E.
Lee, Geo. H., E. E.
Loeb, Frederic W.,E.E.
Madden, E. H., E. E.
Mazzone, S. A., Arch.
Ohlinger, Leo O., C. E.
Schesch, Carl, M. E.
Uebele, Geo. F., C. E.
Verano, Victorio, C. E.
Weinberg, Jos., E. E.
DECEASED:
Lamm, M. H., M. E.
Urban, J. W., Ch. E.

1928

ATTENTION MILWAUKEE ALUMNI: GEORGE V. WINIBERGER, M. E., is with Harnischfeger Corp., 4400 W. National Ave., Milwaukee, and lives at 902 S. 24th St., Milwaukee, Wis. Winiberger has requested information on the Armour Tech Alumni club in Milwaukee. Will you please contact him, and, incidentally, we should appreciate a letter from your secretary giving a list of the officers, etc.

HARVEY A. KOGE, F. P. E., married Miss Wilma Wille of Milwaukee, Wis., on August 22nd, 1936. They are at home to their friends at 2535 W. 4th St., Milwaukee. Koge is with the Fire Insurance Rating Bureau, 626 E. Wisconsin Ave.

W. A. ANDERSON, C. E., has a position with the U. S. government printing office, Washington, D. C., and lives at 303 Spring Ave., Takoma Park, Md.

GEORGE LOANE TUCKER, Arch., lives at 5860 Kenmore Ave., Chicago. He is practicing architecture and teaching at the Hyde Park high school.

CLARENCE T. VANDER MOLEN, C. E., resides at 23 S. Blaine Ave., Hinsdale, Ill. He has a position with the International Filler Co., 59 E. Van Buren St., Chicago.

HAROLD E. LARSON, E. E., is with the General Electric Co., 1 River Road, Schenectady, N. Y., and resides at 135 Elmer Ave., Schenectady. Thanks for your letter about the *Engineer*.

SIDNEY I. COLE, M. E., is vice-president of The Industrial Erectors, 188 W. Randolph St., Chicago.

MISSING:
Baeot, E. C., Jr., C. E.
Brown, Robt. N., Ch. E.
Burke, H. V., F. P. E.
Clark, J. T., F. P. E.
Deiwert, P. S., F. P. E.
Gustafson, G. A., E. E.
Higgins, E. J. S., Arch.
Kleist, M. R., E. E.
Kratochvil, F. M., E. E.
Madden, T. A., Arch.
Milchrist, T. E., Ch. E.
Miller, Leo, F. P. E.
Ogden, Tom, C. E.
Reifler, J. J., F. P. E.
DECEASED:
Everly, A. H., E. E.
Kleinert, G.W.,Jr., E.E.
Wright, C. O., M. E.

1929

We are just informed by none other than WILLIAM N. SETTERBERG, Arch., that he will marry Miss Elizabeth Marie Carlson, of Grand Rapids, Mich., on Jan. 1st, 1937. I am sure I voice the sentiments of a large number of our

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alumni in wishing him a very full measure of success and happiness.

JOHN WILLIAM TECKER, E. E., is in the transportation engineering dept. of the General Electric Co., Erie Works, Erie, Pa.

EDWARD H. MOHR, C. E., resides at 902½ S. First St., Alhambra, Calif. He is with the Los Angeles Gas & Electric Corp., 810 S. Flower St., Los Angeles, Calif.

A card from CARL H. JOHNSON, F. P. E., informs us that he is a special agent with Crum and Forster of N. Y. Group of Fire Insurance Companies, 1406 Northwestern Bank Bldg., Minneapolis, Minn. He resides at 2303 Bryant Ave., S. Minneapolis, Minn.

ARNDT F. ERICKSON, Arch., is associated with the L. A. Snider Engineering Service Inc., 605 N. Michigan Ave., Chicago, and he resides at 141 Lombard Ave., Lombard, Ill.

WALTER C. HEALY, C. E., is a member of the firm Litsinger, Healy, Reid, and Bye, 111 W. Washington St., Chicago, and he lives at 5349 Sheridan Road.

L. C. BRUNSTRUM, Ch. E., is in the laboratory of the Standard Oil Co., Whiting, Ind., and lives at 7666 S. Shore Drive, Chicago.

LEONARD TULAUSKAS, E. E., is chief engineer for the Climax Radio & Telephone Co., 511 S. Sangamon St., Chicago.

WILBUR A. MULLIN, Arch., resides at 6406 28th Ave., Kenosha, Wis. He is practicing architecture with offices at the same address.

KEITH MISEGADES, Ch. E., has resigned as assistant examiner in the U. S. patent office, Washington, D. C., where he has been located for the past seven years, to take up the practice of patent lawyer in North Chicago, Ill. He lives at 2928 N. Kilpatrick St., Chicago.

MISSING:
Craig, Chas. C., C. E.
Farrell, Fredk. B., C.E.
Jillson, Chas. F., E. E.
Kleinhans, G. F., Arch.
Libanoff, Leo, C. E.
Montgomery, G.M.,C.E.
Nissen, H. C., C. E.
Rohr, E. K., F. P. E.
Scheidemantel, H.,Ch.E.
Sherman, E. J., F.P.E.
Yount, John R., Ch. E.
DECEASED:
Greene, W. B., F. P. E.

1930

FOLGER H. BIGELOW, E. E., is with the Dixie Engineering & Supply Co., Refrigeration & Air Conditioning Contractors, Memphis, Tenn., and resides at 353 N. Willett St., Memphis.

CHARLES E. MORRIS, Ch.E., is a research chemist with Armour & Co., U. S. Yards, Chicago.

GEORGE D. HORRAS, F. P. E., is with the Okla. Inspection Bureau, Tulsa, Okla., and resides at 304 W. 12th St., Tulsa.

BERNHARD J. WELDON, F. P. E., is with the Kansas Inspection Bureau, 701 Fillis Singleton Bldg., Wichita, Kan. Weldon lives at 654 S. Green St., Wichita and has a son three months old. Other Armour F. P. E.'s in the Wichita office, are VERNON B. STEENROD, '29; CLAUDE W. RINKER '29; and WILLIAM R. MILLS '34.

STANLEY E. JOHANSEN, Arch., resides at 1616 Dakota Ave., South Sioux City, Nebr. He is practicing architecture with offices at the same address.

JOHN P. EDSTRAND, C. E., is assistant hydraulic engineer U. S. Engineers office, Mo. River Division, Postal Telegraph Bldg., Kansas City, Mo.

JACK M. DOLLENMAIER, E. E., is in the Cincinnati office of the Line Ma-

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terial Co., Milwaukee. His business address is 603 Schmidt Bldg., Cincinnati, Ohio, and he lives at 1848 Andina Ave., Cin.

A recent card brings the information that ARTHUR T. REGLEIN, F. P. E., was married last August and that he is with the Iowa Insurance Service Bureau, 515 Ins. Exch. Bldg., Sioux City, Iowa.

WALTER L. FILMER, E. E., paid us a recent visit. He is with the Bell Telephone Laboratories, 180 Varick St., N. Y.

MISSING:
Berg, Ernest W., Arch.
Christensen, F.E., Arch.
Dobberman, M.R.,Arch.
Fischman, L. H., C. E.
Frost, A. J., M. E.
Goldenberg, E., Arch.
Goldman, J. R., Ch. E.
Haegele, A. C., F. P. E.
Kilbourne, R.E., F.P.E.
Peterson, F. B., E. E.
Sanborn, F. E., E. E.
Solstad, E. W., Arch.
Taylor, J. L., E. E.
Tell, F. O., Arch.
Williams, Robt. R.,C. E.
Wood, M. B., C. E.

DECEASED:
Kara, Jas. J., C. E.
Van Valzah, W.S.,M.E.

1931

GEORGE J. JENNINGS, Jr., E. E., is teaching math and science during the day at the Schurz high school and during the evening at the Englewood high. George is also filling the position of tennis pro. at Northmoor Country Club. He lives at 5200 Blackstone Ave., Chicago.

ROLAND G. PAMLER, E. E., is engineer for the Hammond-Calumet Broadcasting Co., Hammond, Ind.

J. FRED BORROWDALE, M. E., is associated with Coverdale & Colpitts, Consulting Engineers, 120 Wall St., New York, N. Y.

FRED B. ATTWOOD, Ch. E., is chief chemist at the Ogden Plant of the Container Corp. of America, His residence is 812 Scoville Ave., Oak Park, Ill.

RICHARD R. EDDY, F. P. E., is with the Ill. Inspection Bureau, 309 W. Jackson Blvd., Chicago.

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KARL E. W. HELLSEN, C. E., lives at 1043 Rush St., Chicago. He is with the Youngstown Sheet & Tube Co., East Chicago, Ind.

JAMES C. FILMER, E. E., is in the engineering dept. of the Tungsol Lamp Works, Newark, N. J. Filmer married Miss Doris M. Pleger, of Wheaton, Ill., in July. Happiness and good luck to both.

THADDEUS S. TRZYNA, E. E., is the chief engineer for the Quam-Nichols Co., manufacturers of radio speakers, 526 E. 33rd Place, Chicago.

O. R. MURPHY, E. E., is with the Standard Transformer Corp. of Chicago, instead of Belmont Radio Co., as stated in the last issue. Beg your pardon.

L. D. DAVIDSON, E. E., is electric control engineer for the Cline Electric Co., Daily Times Bldg., Chicago. Davidson informs us that T. A. McGILL, E. E., '32, and T. F. JONES, M. E., '35 are with the same company.

ROBERT M. KRAUSE, M. E., married Miss Eleanor Driese of Glenwood, Ill., last

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July 31st. They reside at 5303 Kimbark Ave., Chicago. "*Don't forget to change to this address for my Engineer. This is one publication that is prominent in the collegiate field, containing many articles throughout the year that are applicable to present day conditions. The alumni news is very interesting.*" Krause is with the Container Corp., Chicago.

MISSING:
Abramson, R. J., E. E.
Blahna, Chas., E. E.
Cherney, N. (Czernecki), M.E.
Crow, Ralph M., Arch.
Doane, Thos. W., Arch.
Dodson, Chas. E., Arch.
Ficarratto, S. C., C. E.
Griffin, Chas. J., E. E.
Lopatowski, E. J., C.E.
Morgan, M. J., C. E.
Myers, K. H., E. E.
Wleklinski, T. J., Ch.E.
Yzaguirre, M. A., Ch.E.

DECEASED:
None.

1932

RUSSELL LONG, Ch. E., is chemist for the C. H. Hollup Corp., manufacturers of welding rod and welding supplies, 3357 W. 47th Place, Chicago, Ill.

T. J. WESTERBERG, C. E., paid us a visit last month. He is with the Chicago, Milwaukee, St. Paul & Pacific R. R.

WILLIAM A. STOCKLIN, E. E., is with the Utah Radio Co., 820 N. Orleans St., Chicago.

JOHN O. CAVANAUGH, Ch. E., recently accepted a position as metallurgist with the C. H. Hollup Corp., Chicago.

E. H. CHUN, M. E., is in the U. S. Engineers office, 605 Commerce Bldg., St. Paul, Minn.

ALBERT ARTHUR KOCH, C. E., is senior engineering aid, U. S. Engineer office, Los Angeles, Calif., and resides at 1375 E. Orange Grove Ave., Pasadena, Calif.

HARRY P. RICHTER, C. E., is with the McKey & Poague Inc., real estate, 2100 E. 71st St., Chicago. We understand that Richter is teaching evening school, attending Northwestern University evening school, and doing his bit in politics.

JAMES S. McCALL, M. E., was until recently with the Limited Can Mfg. Co., Chicago, but is now in the research engineering dept. of the Union Pacific R. R. Co., Room 504 Union Pacific Bldg., Omaha, Nebr. McCall was married July 25th, '36 and resides at 2215 Howard St., Omaha.

FREDERICK S. BEALE, E. E., is in the operating dept., American Falls Plant, Idaho Power Co., American Falls, Idaho. We shall be expecting to see him next June, as stated in his card, and we can show many changes and improvements.

CHARLES M. SCHOCK, Arch., is industrial designer for C. E. Waltman, 737 N. Michigan Ave., Chicago.

WILLIAM G. SCHULTZ, F. P. E., is with the Ohio Inspection Bureau, 737 Spitzer Bldg., Toledo, Ohio.

JOSEPH DeORIO, M. E., is chief draftsman, Warwick Mfg. Co., 1700 W. Washington St., Chicago, Ill.

MISSING:
Bryant, Edw. L., C. E.
Casey, Jas. J., C. E.
Cavanaugh, J. C., Ch.E.
Dickey, Wm., E. E.
Fox, Chas. H., C. E.
Frye, Paul H., E. E.
Hawes, Chas. S., M. E.
Holland, W. A., Ch. E.
Hromada, F. M., C. E.
Poe, Morris, Arch.
Stahm, Eli B., Arch.
Tonsager, H. A., Arch.
Toopeekoff, E., M. E.
Wierzbowski, A.E., C.E.

DECEASED:
None.

1933

JAMES W. JUVINALL, E. E., is with the U. S. Gypsum Co., 300 W. Adams St., Chicago, and resides at 1962, E. 71st Place, Chicago.

JACK MACLENNAN, C. E., is in the

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ALBERT L. MAHONE, E. E., is a sales engineer for the Eagle-Picher Sales Co., 4401 S. Western Blvd., Chicago.

HENRY Z. FISHMAN, Ch. E., is with the International Neon Signs, 14 N. May St., Chicago.

MAURICE J. ERISMAN, M. E., is with the Link-Belt Co., Caldwell Plant, 2410 W. 18th St., Chicago.

WILFRED W. DAVIES, Arch., is with the United Air Lines, 5936 S. Cicero Ave., Chicago.

EARL C. BOLLINGER, M. E., is with the Combustion Engineering Co., 200 Madison Ave., N. Y.

WILLIAM H. HULSWIT, E. E., is teaching in the physics dept. Northwestern U., Evanston, Ill.

ARTHUR L. STEINHAUS, F. P. E., is an inspector for the Fire Insurance Rating Bureau, 5 W. Main St., Madison, Wis.

WALTER G. ANDERSON, Arch., is with Eugene & Max Fuhrer, 188 W. Randolph St., Chicago.

PASQUEL DIORIO, E. E., is an assistant chief engineer, Belmont Radio Corp., 1257 W. Fullerton Ave., Chicago. Beg your pardon for mixup in names last issue.

MISSING:
Barnett, O. T., Ch. E.
Belton, Geo. R., M. E.
Burnet, Alan D., C. E.
Clanton, C. N., F.P.E.
Cole, Abraham, Arch.
Emling, Chas. A., Arch.
Hallen, Geo. K., E. E.
Hanrahan, Geo., C. E.
McLane, J. R., Arch.
Miller, J. H., Ch. E.
Moline, Robt. W., Ch.E.
Paine, F. W., Ch. E.
Pechman, J. R., F.P.E.
Sanchez, Jos. R., E. E.
Shaver, Earl G., Ch. E.
Smethells, W.T., F.P.E.
Vanderpoorten, S. A., F. P. E.
Wilson, Don. G., E. E.
DECEASED:
None.

1934

GEORGE M. REED, E. E., is with the Fairbanks Morse Co., Milwaukee, Wis.

ROBERT P. RONOUSKI, M. E., is sales engineer, Lewis Shepard Co., material handling equipment, 564 W. Randolph St., Chicago.

JOHN E. SCHREINER, E. E., is an engineer, John Marsch Inc., contractors, Chicago.

WARREN A. KNUDSON, E. E., is director of engineering and research, Silvercote Products Inc., 1901 Factory St., Kalamazoo, Mich.

ROBERT H. SCHORLING, Ch. E., is with the Standard Oil Co. of Ind., Whiting, Ind.

RALPH W. STAHL, M. E., is with A. C. Nielsen Co., 2101 Howard St., Chicago.

ROBERT W. SWANSON, F. P. E., is with the Iowa Insurance Service Bureau, 114 Insurance Exchange Bldg., Des Moines, Iowa.

DON E. TRAVER, M. E., is in the engineering dept., Regulator Co., 2720 Greenview Ave., Chicago.

FRANK W. WOODSMALL, E. E., holds the position of experimental electrical engineer, Republic Flow Meters Co., 2240 Diversey Parkway, Chicago.

NORMAN E. COLBURN, Jr., C. E., is a draftsman for the Mead Corp., paper manufacturers, Chillicothe, Ohio. Colburn lives at 127 E. 5th St., Chillicothe, Ohio.

FRANK KOKO, C. E., is in the blast furnace dept., Carnegie-Illinois Steel Co., 89th and the Strand, Chicago.

ROBERT W. SUMAN, M. E., is with

Radio

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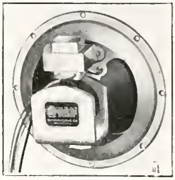

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THEODORE C. GAULT, E. E., is with the Commonwealth Edison Co., Chicago.

RAYMOND W. MARTY, Ch. E., is doing development work at the Phoenix Metal Cap Co., 2444 W. 16th St., Chicago.

ELMER G. LUNDIN, E. E., is with Jos. T. Ryerson & Son, Inc., 2558 W. 16th St., Chicago.

MISSING:
Cohrs, A. J., Ch. E.
Eberly, Kenneth, Ch.E.
Gibian, F. M., M. E.
Korink, Geo. T., C. E.
Novak, V. J., Arch.
Pfeiler, A. J., C. E.

DECEASED:
Hanes, Geo. A., M. E.

1935

MALCOLM C. FORSYTH, Arch., is now at the University of Va., taking graduate work, having been awarded the du Pont scholarship offered at that institution.

C. H. RIESZ, Ch. E., is in the chemical dept. of the Sinclair Refining Co., Chicago.

K. O. STOCKING, C. E., is employed in the U. S. Engineer office, Clock Tower Bldg., Rock Island, Ill.

RICHARD F. BERGER, Ch. E., is chemical engineer, Universal Oil Products Co., East Chicago, Ind.

DONALD E. YOUNG, E. E., is with the Carnegie-Illinois Steel Corp., South Chicago, Ill.

EDWIN N. SEARL, F. P. E., is with the Mo. Inspection Bureau, 1330 Pierce Bldg., St. Louis, Mo.

JOHN BIRDSONG, M. E., is with the General Electric Co., at Fort Wayne, Ind.

VERNER A. HEDLUND, E. E., is a sales engineer for the Mercoid Corp., 4201 Belmont Ave., Chicago.

JOHN F. HUMISTON, Ch. E., is with E. H. Sargent & Co., 155 E. Superior St., Chicago.

CHEDO P. GRAHAM (formerly Grakavac), C. E., is in the engineering dept. of Stewart-Warner Corp., 1828 Diversey Pkwy, Chicago.

ROBERT H. HEDIN, F. P. E., is in the office of the Aetna Fire Insurance Co., 410 N. Michigan Ave., Chicago.

FRANK HENKE, E. E., is with Harper-Wyman Mfg. Co., 8562 Vincennes Ave., Chicago.

LEROY J. BECKMAN, M. E., is with Wallace & Tiernan Co., Inc., 605 Washington Blvd., Chicago.

DAVID W. KETTLESTRINGS, C. E., is with the Mississippi Valley Structural Steel Co., 25th Ave. and Norwood St., Melrose Park, Ill.

MISSING:
Bolton, H. T., C. E.
Zukowski, C. M., Arch.

DECEASED:
None.

1936

VICTOR J. KROPF, E. E., is taking the graduate student training course at the Westinghouse Electric & Mfg. Co. plant, E. Pittsburgh, Pa. He is living at 502 Hill Ave., Williamsburg, Pa. We quote the following from a recent letter received from Kropf:

"Westinghouse has been treating me very nicely. I am on what is called the Graduate Student Training Course which consists of seven months of shop assignments and a year or more training in headquarters sales offices. All indications are that Westinghouse is going to make Kropf into an apparatus salesman which is just what I'm after right now. Our shop assignments consist of inspection, time study, production, test, and cost department work. I have been on inspection in the Generator Division, on production in the Motor Division, and am scheduled for test in the Switchgear Division. We merely assist the regular men on their jobs, but before we realize it we are learning more about the operation of the plant and its sections than seems possible in such a short time."

HOWARD P. MILLEVILLE, Ch. E., is a graduate student at M. I. T., Cambridge, Mass., and is living at the M. I. T. Dormitories. The following is quoted from a letter recently received from Milleville.

"Words fail to express the pleasure I experienced upon receiving the Engineer and Alumnus for the first time as an alumnus (class '36) . . . To know that the happy event can be looked forward to four times a year henceforth is genuinely fascinating."

"Working on the Engineer and Alumnus Staff and Board was just about the highlight of all my activities at Armour, and it will be a long time till I forget—if ever—the meetings of the first Managing Board."

PETER L. SLUGG, E. E., is in the engineering dept. of the Pyle-National Co., 1334 N. Kostner Ave., Chicago.

ALVIN J. RAGAN, Ch. E., is with the Silvercote Products Inc., 1915 Factory St., Kalamazoo, Mich.

LEONARD W. ROBBIE, Ch. E., is with the Universal Oil Products Co., Riverside, Ill.

ROBERT O. PATTERSON, M. E., has a position with the Powers Regulator Co., 2720 Greenview Ave., Chicago.

GEORGE W. ORMSBY, Eng. Sc., is in the lubricating engineering dept. of the Standard Oil Co., Whiting, Ind.

HARRY S. NACHMAN, M. E., is with the Link-Belt Co., Chicago. A letter from Harry, recent student editor of the *Engineer*, would be welcome.

ORIN EUGENE NORRIS, Ch. E., is with the Material Carbon Co., 11th and College Ave., Niagara Falls, N. Y.

JOSEPH W. BAGNUOLO, Arch., is with L. R. Solomon and Associates, Architects, 185 N. Wabash Ave., Chicago.

G. H. BERGQUIST, C. E., is with the Highway Dept., State of Illinois.

ARTHUR J. SKJORDAHL, M. E., has a position with the Teletype Corp., 1400 W. Wrightwood, Chicago.

ROBERT M. PAULSEN, Ch. E., is with the North Shore Coke and Chemical Co., Waukegan, Ill.

EARL J. KIRSCH, E. E., is sales engineer for the Ilg Ventilating Co., 182 N. La Salle St., Chicago. Thanks, Kirsch, for the list of 1936 electricals and their locations. We shall try and give a complete report on them in the March issue, so please keep us informed as to additions and changes.

JOHN GEORGE WALDMAN, M. E., informs us that he expects to be appointed an aviation cadet in the U. S. N. R. to leave for training in Pensacola, Fla. about Dec. 30.

ROBERT HARRY KNABE, C. E., is with the engineering dept. of the N. Y. Central R. R., La Salle St. Station, Chicago.

JOHN FRANK KAHLES, Ch. E., is a graduate assistant, dept. of chemical engineering, University of Cincinnati, Cincinnati, Ohio.

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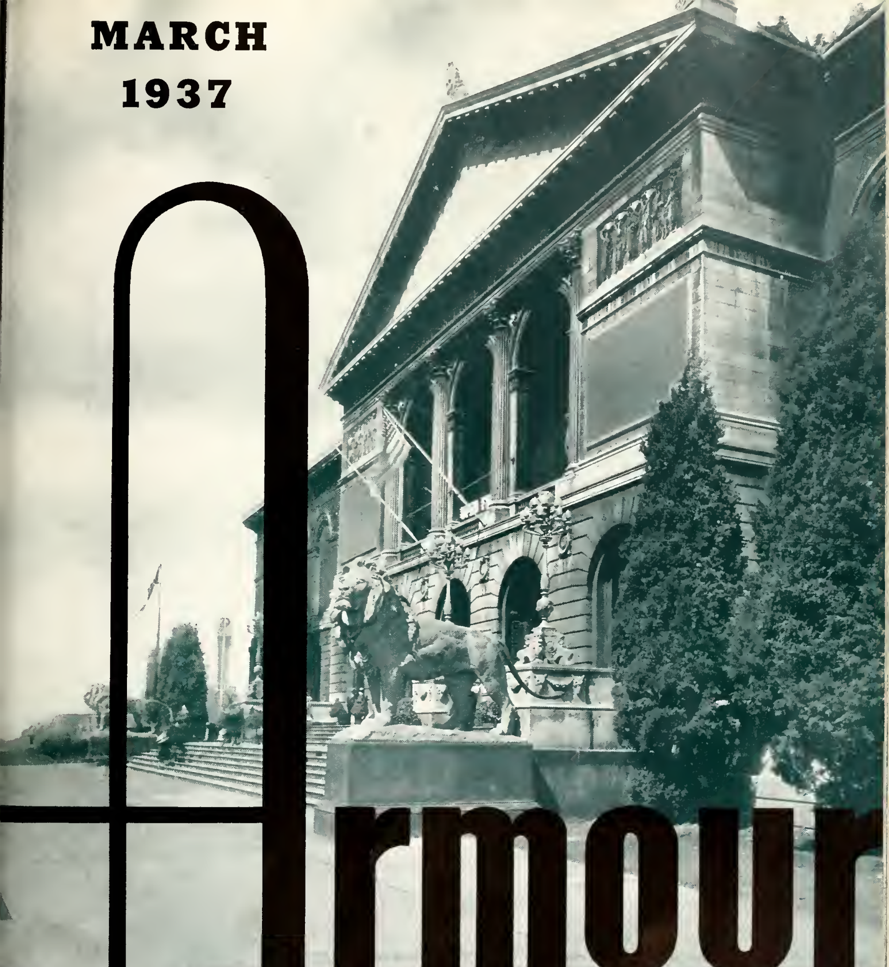

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G-E *Campus News*

ICE WATER

New electric drinking-water coolers introduced by General Electric have replaced the antiquated ice-cooled type on several prominent Midwestern railroads. This is another step in the modernization program being carried on by railroads to increase passenger traffic.

The new coolers are designed to overcome many disadvantages of the ice-cooled units. With foot operation of the self-contained units, only one hand need be used to get a drink. Cleanliness is promoted because of the absence of ice-filling operations, and the expense for maintenance and service is reduced to a minimum.

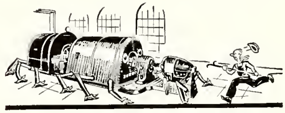
The water is automatically maintained at a healthful and refreshing temperature through thermostatic control. Coolers are designed either as self-contained units or as separate cooling and refrigerant condensing units for remote installations in the car.

AS VACUUM TUBES GREW UP

As the vacuum tubes grew, they found their style cramped because metal could be sealed to glass only in thin strips. Research took up the problem, and it is now possible to fabricate glass and metal together, in any size or shape, very much as two metals are fabricated.

In a successful glass-to-metal seal, the temperature coefficients of expansion of the glass and the metal must agree exactly over a wide range of temperature. Painstaking investigation—much of it in the General Electric Research Laboratory, at Schenectady—developed new alloys and new glasses, which could be used for this application.

The first application of this new knowledge has been in metal radio tubes, now standard in almost all radio receivers. Power thyratrons, switches, capacitor bushings—all these follow along the new trail. We cannot predict how far this new technique will go, but the possibilities are numerous and inviting.



TURBINE STEEL CREEPS

If the wrong kind of steels were used in turbine construction, the machine would not go creeping across the floor with the operator in hot pursuit, but the results might be even more disastrous.

Part of the increase in efficiency that has come about in the power-generating field in the last few years has been due to increased steam temperatures and pressures. As a result, the modern turbine shell runs, almost literally, red hot. This shell must withstand pressures such as exist half a mile down in the ocean and must keep a 20-ton rotor spinning perfectly in line. Heat softens metal, just as it softens candy, and permits it to stretch. This stretch, however, must be kept to the merest creep—about one part in 1000, if the changes are uniform.

In the Schenectady Works turbine shop, automatic electric furnaces hold samples of turbine steel at the temperature which will occur in the turbine. Gauges, which indicate changes of one part in a million, measure the creep as the pieces are exposed to heat for years at a time. From these tests, the best steel is selected.

It has been largely due to this research carried on by General Electric that the temperature and pressure of steam used in power generation have been raised to unexpected highs in the last few years.

96-363DH

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THROUGHOUT industry, wear on metals is an important cost factor. Until recently, most wearing parts had to be made entirely of special high-cost materials. Now, by welding, rapidly wearing surfaces can be covered with a wear-resistant alloy. Welded additions of bronze or Haynes Stellite—a wear-resisting alloy of cobalt, chromium and tungsten—create excellent wear resistance at low cost.

Long Life at Low Cost

Wherever metal has hard work to do, wearproofing by welding plays an important part. Under the toughest conditions, in mines and mills, in factories and on farms, in construction and oil-drilling, it is saving money and time.

Wearproofed parts will last many times as long as those made of unprotected iron or steel. Welding cost, including the necessary alloy, is only a fraction of the total cost of a new part. Then, after long, hard service, the part can be re-covered—another wear-resisting surface can be welded on at small cost, and the part is again as good as new.

Extensive Savings

Savings through the application of wear-resistant alloys are not confined to the lower cost of the part involved. Less power is used. Inventories are cut due to the consequently lowered investment and simplified control. Machine shutdowns for replacement are fewer. Maintenance costs are decreased, and a smaller crew can handle the necessary repairs. Further, the plant, without added equipment, can turn out a greater volume of production.

Figures drawn from case-histories where wearproofing is used are often surprising. A glance at the adjoining column will indicate many of the possibilities inherent in this process.

INTO THIS YAWNING CAVITY goes the dirt to make Grand Coulee Dam. Bucket front and teeth were hard-faced by welding. The result of this wearproofing was six months' service on Bonneville Dam, and many more months of trouble-free, repairless service on Grand Coulee.

Welding Savings

Welding makes automotive exhaust valve seats good for 150,000 miles and more, with no regrinding in truck and bus motors, the toughest kind of service. These valve seats are wearproofed by welding Haynes Stellite to the contact surface. Ordinary cast-iron seats need regrinding every ten thousand miles.

* * *

Welding saved $2200 in one year for an Ohio pulp mill. Haynes Stellite was welded to the wearing surfaces of shredder knives. This work cost $90; knives, from the scrap heap, cost nothing. Hard-faced knives lasted for six months, and were again refaced by welding. New knives cost $200, last one month.

* * *

Welding a wear-resistant facing on the cutting edges of boiler-tube cleaners yields a twenty-fold saving—each cleaner will clean twenty times as many tubes as an ordinary cutter. When worn, hard-faced cutters are rebuilt for another long service.

* * *

Welding cured pump troubles in a pulp mill. Shafting on a sludge pump was wearing rapidly. Packing glands had to be tightened every hour, completely repacked once a week. The shaft was fast disappearing. Hard-faced by welding with wear-resistant metal, the shaft ran for three months with no attention. no appreciable wear.

* * *

Welding lengthens the life of blooming-mill shear clutches three times. Clutches previously ran 49 days, then went to the scrap pile. Now, wearproofed by welding, these clutches average 217 days before any attention is necessary. The same clutches are then refaced and used again.

* * *

Welding has solved an impossible lubricating problem. At a Southern mill where heater furnaces are fed by internal conveyor, rolls and bearings operate at 750 degrees Fahrenheit. Lubrication is impossible. A wear-resistant coating, built up on the rolls and bearings by welding, makes the conveyor last indefinitely, eliminates *need* for lubrication.

* * *

Tomorrow's engineers will be expected to know how to take advantage of this modern metalworking process. Many valuable and interesting technical booklets describing the application of the oxy-acetylene process are available without obligation. For further information write any Linde office.

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OPPORTUNITY

By W. J. Cameron

◆

There is a good old word that has been badly abused by our muddled thinking, but a word that manages to survive, and is certain to recover its former standing. That word is opportunity. It means the port or the opening or the door that stands opposite you, and of course anything to be opposite you must be directly before you. The best observers and interpreters of life have added the sense that always there is such a door, and that it is accessible.

In this latter sense opportunity has met much recent challenge. There are many who say it no longer exists. Mostly they mean, we may suppose, that the door that now stands opposite them, the door at present accessible to them, is not the door they want. They thought opportunity meant a big door, or at least an inviting door; and this present one may be small and plain, a side door or even a back door; and because they do not understand that this is their door, they say there are no doors, no opportunities. That is one mistake we make. A thousand doors may be closed, our door is the one that stands open, provided nothing dishonorable is on its threshold. That it is a plain and humble door makes no difference whatever; every door, big or little, opens upon the same wide world of possibilities, and every career will stretch or shrink to the size of the person who makes it.

We mistake once more when we think that given the opportunity, that is all we need. But opportunity has been the ruin of many. Opportunity is a day of judgment. It is to be regarded with respectful deference, for every opportunity is a test. Far sterner than what a man may require in his opportunity is what the opportunity may require in the man. There are three kinds of opportunity.

There is first the opportunity that makes you. Everyone has that. In youth it is the opportunity to learn. The boy or girl asks: "What good is all this stuff going to do me?" None can answer that but you. We can only say that it took mankind a thousand years to learn this thing, and if you learn it now you are richer by a thousand years; it took mankind 100 years to learn that, and if you learn it now you can start abreast of your times. If not, how and when do you expect to catch up? There's not a single fact you learn or a tiny discovery you make today that may not stand forth—even a quarter of a century hence—as the very thing you need in some crucial hour. The days and all their duties are full of the sort of opportunity that makes you.

Then, there is the opportunity that takes you. When you talk with great and useful men to learn how they became what they are, you will discover that it is just as much a mystery and surprise to them as to anyone else. They thought they knew what they wanted to be, but a petty incident, identifiable only in the afterlook, suddenly turned them into another path. And there they are! Few persons choose their jobs; the job reaches out and chooses them. But it chooses them at the level of their preparation. Some young people have not the remotest idea what they are going to be, and there need be no anxiety about that. Neither did the present leaders of the automobile world know what they were going to be—there were no automobiles when they were growing up. They thought they were going to be this or that, but along came the other thing. Neither did the leaders in the electrical, or chemical, or aviation or radio worlds know what their life-work would be—these things could not be chosen because they did not exist; a man could not prepare for them, he could only prepare to do whatever life might ask him to do. And most of you, my young friends, are going to engage in work that has not appeared yet. But get ready. Look ahead 20 years. Try to see what ought to come in the world of housing, transportation, heating, banking, literature, farming, education, merchandising, journalism, drama—anything, and prepare for anything! Acquire all possible equipment, none of it will come amiss, and you will be ready when opportunity takes you.

If you do this you need have no fear of the third kind of opportunity—the opportunity that breaks you. The worst thing that can happen to some men is to get a promotion—they are not ready for it. Many a young fellow can sell himself, and when he has done that he is through—he has nothing more to deliver. His opportunity is his defeat—he was not ready. He did not invest in himself. Serious thinking was too hard on his head. Good books required too much of his time. He wants to be a passenger in the boat of life, but pulling his own weight blisters his hands. He knows how to arrange his hair but not how to manage his mind. Opportunity comes and finds him out. But because he has the right stuff in him, he will learn from that experience, and when opportunity returns, as it always will, it will find him ready.

Look again at that opportunity which is directly before you—it may not be what you dreamed, but once in it, it will take you anywhere you want to go—if you are ready. If you are not ready, beware of opportunity.

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THE WORLD'S LONGEST BRIDGE SPAN

By Clifford E. Paine

THE traveler approaching San Francisco by sea finds his ship heading for a mile wide gap in the mountainous shore line. Passing through this natural gateway which is known the world over as the Golden Gate, he sees before him a great expanse of water that extends forty miles to the southward, and thirty to the northward. On his right lies the City of San Francisco. On his left is marvelous Marin County with its delightful suburban communities—the gateway to scenic wonders of the Redwood Empire. Before him straight across the Bay on the far distant shore lie the cities of Alameda, Oakland, and Berkeley. Directly above him is the Golden Gate Bridge, man's most recent victory in his conquest of nature's barriers to progress.

For many years the ferry boats have constituted the only means of transportation between these rapidly expanding communities. Improvement in highways and increased use of automobiles, coupled with the growth of the Bay Cities, brought forth the demand for a corresponding improvement in transportation facilities. In 1918 investigations were made and the feasibility of building a suspension bridge across the Golden Gate was established by Joseph B. Strauss. As a result of the movement then started, the City and County of San Francisco joined with five counties to the north in forming the Golden Gate Bridge and Highway District to build and operate the Golden Gate Bridge. Mr. Strauss was made Chief Engineer of the District, and a bond issue of $35,000,000 was voted in November, 1930. Plans for the bridge were made by Strauss & Paine, Inc. and construction was started in January, 1933. The bond issue was based on a construction cost of $27,165,000. The bridge will be completed with a construction cost about one-half of one per cent under that estimate.

Traffic studies have indicated that during the first year of operation two

The Golden Gate Bridge at San Francisco.

million cars will pass over the bridge and that the volume of traffic will possibly increase at the rate of about five per cent per year during the first ten years of service. The bridge has a capacity of five thousand cars per hour, and it is expected that this will be fully utilized by holiday and week-end traffic from the very beginning.

Bridge Details

Having passed through the Gate our traveler will now without doubt fix his attention on the magnificent structure under which he has just passed. He may have traveled the world over, but nowhere has he seen a bridge of such magnitude or graceful beauty. At mid-span it is two hundred thirty feet above the water, high enough to let any ship afloat pass underneath with plenty of clearance. It's a mile across and there's only one pier in the water! That pier is only eleven hundred feet from shore; forty-two hundred feet between the towers which support the cables and which in turn support the floor of the bridge. In all his travels he has not seen towers like these. The design gives confidence of strength and stability and at the same time gives that feeling of satisfaction most often inspired by structures that are architecturally correct. An officer of the ship, standing beside him, tells him that the tower-tops are seven hundred fifty feet above the water. The two cables which pass over the tops of the towers and end in massive blocks of concrete back on either shore, are thirty-six and one-half inches in diameter—the largest bridge cables ever made! Each cable is seven thousand seven hundred sixty feet long, contains twenty-seven thousand five hundred seventy-two parallel wires about the size of a lead pencil. Eighty thousand miles of wire were required for the two cables—enough to encircle the globe more than three times at the equator. Each cable has an ultimate tensile strength of two hundred million pounds. Yes, it takes a pretty good anchorage at each end of the cable to withstand this pull. Fortunately solid rock was found at each end, and big pockets were excavated in this rock to form a setting for the concrete anchorage blocks each of which contains thirty thousand cubic yards. You're right, there is a trick about fastening the cable to the anchorage. You see the wires of the cable are grouped into sixty-one strands. Some distance in front of the anchorage a cast steel band is placed around the cable, and between that point (called the "splay point") and the anchorage the strands "fan-out" so that at the anchorage they are separated by two and one-half feet or more. Each strand is there anchored to a pair of steel bars which extend back into the concrete for about one hundred thirty feet where they terminate in heavy steel girders.

Compacting the cables preparatory to applying the steel wrapping.

Our friend realizes at a glance that the entire floor structure of the bridge is suspended from these huge cables. He can see at fifty-foot intervals the steel ropes which hang down from the cables and attach to the stiffening trusses. At each point of attachment there are four parts of rope two and eleven-sixteenths inches in diameter. The concrete roadway and sidewalks are carried directly on this suspended steel framework. There it hangs like a great hammock between the giant towers. How far will it swing sideways? That is a fair question.

The informative officer in his frequent passing through the Gate has been asked all kinds of questions about this unusual structure and is prepared with all the answers.

Stresses and Strains

Under the effect of a broadside wind at one hundred miles per hour the bridge floor at mid-span might swing twenty-one feet out to one side. Since winds in San Francisco rarely reach half this velocity and never have exceeded sixty miles per hour, it is quite probable that it will never be called upon to withstand such a strain. Yes, the floor moves up and down too with every change in temperature and load. A rise in temperature causes the cable to lengthen and consequently the sag increases. Obviously the sag in the center span will be decreased by loading the side spans and increased by loading the center span. The most severe combinations of loading and temperature will cause the floor of the bridge at mid-span to rise ten feet above or fall ten feet below its normal elevation. In order to accommodate these movements as well as the lengthening or shortening of the suspended steel structure itself, special joints are provided where the floor of the suspended span joins the floor that is carried directly by the tower. These joints permit angular motion in horizontal and vertical planes combined with a longitudinal movement of five feet from one extreme to the other, and they are so designed as to give a smooth riding surface across the joints under all conditions of load and temperature.

Does the cable slide over the top of the tower? No! The tower-tops are pulled back and forth by the cables under the varying combinations of temperature and loading. Under normal conditions, that is, with temperature at seventy degrees Fahrenheit, and no load on the span (other than its own dead weight), each tower is bent shoreward six inches. Now if the temperature rises forty degrees and full 'live' load is applied to the center span and the far side span only, the tower will be deflected channelward eighteen inches. If the temperature drops forty degrees below the normal temperature of seventy degrees Fahrenheit and full live load is applied to the near side span only, the tower will be deflected shoreward twenty-two inches. In other words, the tow-

Looking north across the bridge. Painters at work on the suspenders.

ers may be bent to and fro so that their tops move through a range of forty inches in the longitudinal direction of the bridge. In a direction transverse to the bridge the towers would deflect twelve and one-half inches under the same wind load which would cause a twenty-one foot deflection in the center span.

Each tower receives from the two cables a total load of one hundred twenty-three million pounds. The concrete piers upon which the steel towers rest must carry this load plus the weight of the steel tower, which is forty-four million pounds, or a total applied load of one hundred sixty-seven million pounds. The San Francisco Pier, allowing for buoyancy, weighs five hundred sixty million pounds, and therefore the total load on the foundation which supports the San Francisco Pier and Tower is seven hundred twenty-seven million pounds.

Construction of the San Francisco Pier

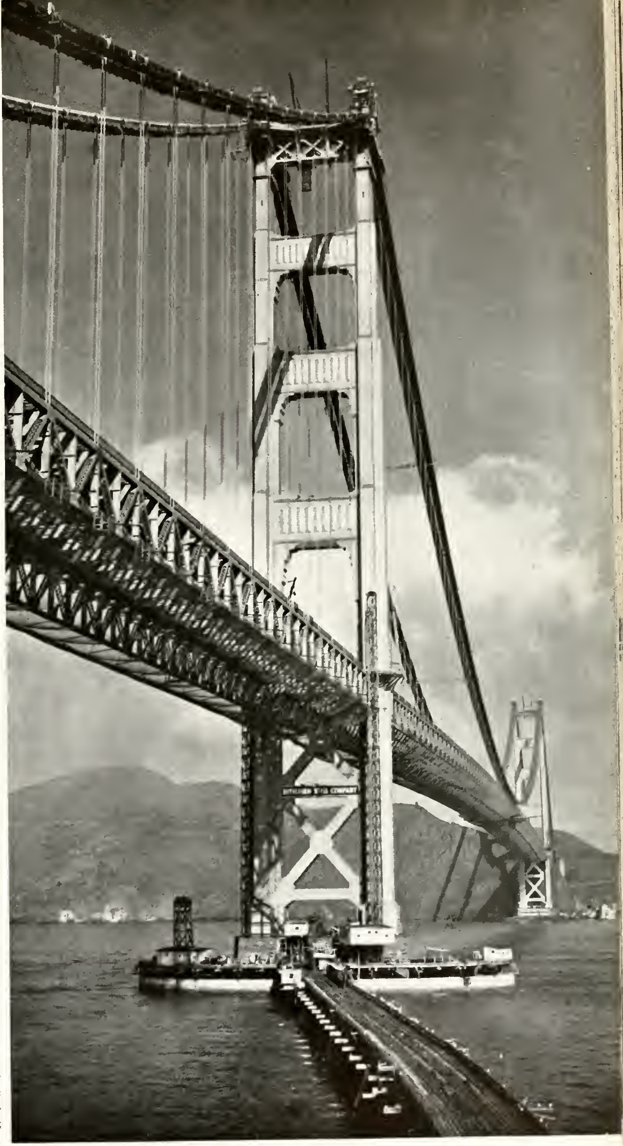
In design and construction the Engineers were confronted with some unique problems. From the outset the construction of the San Francisco Pier was recognized as a major task. It was located eleven hundred feet out from shore in water having an average depth of sixty-five feet. The site was exposed not only to the destructive ocean winds and waves, but also to tidal currents of seven miles per hour. The difficulties were multiplied by the fact that the floor of the strait was bare rock, and, consequently, it was difficult to anchor equipment and get a "toe hold." The completed pier would have to have the protection of a very substantial fender to guard against damage from derelicts or ships out of control. It was decided that this fender would be built as a part of the pier—a wall twenty-seven and one-half feet thick forming the circumference of the pier. It was conceived that this wall could be built first in small successive units so that as exposed surface to tides increased, the mass of previously placed wall would afford a corresponding increase in stability. The initial section could be placed by anchoring to the rock a steel form about thirty feet square. Divers could place forms around this frame and then the box thus formed could be filled with concrete. The initial unit in place, succeeding units could be built out in both directions eventually encircling the whole pier site. The pier within the wall could then be completed with full protection against tides and storms.

This general scheme was carried out with frequent adjustment in plans in order to meet the conditions. It was a battle between men and the forces of nature. When one attack failed, new tactics were employed, and finally the job was done. The first operation in the field was the excavation of the rock at the pier site until there was a bowl-shaped hole about the size of a football field, with sloping rock sides varying in height from twenty-five feet to forty-five feet, and with the bottom at an average depth of one hundred feet below the surface of the water. Within this bowl the circumferential fender wall was built. The lower course of the wall projected toward the inside of the bowl so as to interlock with the central portion. Thus the pier and fender are united into a solid mass from the bottom up to a point thirty-five feet below the water surface. Above that point the fender wall rises as an independent structure so that it alone must withstand any blows directed against it. Two years of struggle brought completion of this pier. Meantime the corresponding pier on the Marin side had been completed and the steel tower erected upon it. Anchorages had also been completed in readiness for cable construction which had to await completion of the San Francisco Tower. This required another six months, but in the meantime the contractor for the cables was getting everything in readiness so that there would be no delay after the tower was ready. At each anchorage he set up machinery for unreeling the wire of which the cables would be built. This wire was manufactured at Trenton, New Jersey. It was shipped in coils of about four thousand feet (four hundred pounds) each. These coils were put on to reels at the "reeling plant." Each reel held forty coils all spliced together into one continuous wire one hundred sixty thousand feet long. Splices were made by pressing an alloy steel sleeve on to the two ends which were to be joined, the ends having first been placed in an hydraulic press which made them oval in cross-section and left deep corrugations in their surfaces. These splices were so good that in most tests the wire broke outside the splice.

Spinning the Cables

Before cable wire could be erected it was necessary to build "catwalks" upon which the workmen could stand. These catwalks were sixteen feet wide and reached from anchorage to anchorage passing up over the intervening towers and following the curve which the cables would take, but located so that they would lie about three feet below them at all points. The catwalks were simply board walks

(Turn to page 32)



Bridge nearing completion, as viewed from water level at the south end.

THE DEPARTMENT OF ARCHITECTURE

OF ARMOUR INSTITUTE OF TECHNOLOGY

THE Department of Architecture of Armour Institute of Technology, because of its location in the Chicago Art Institute, provides its students with opportunities for unlimited study. It is the only architectural school of collegiate rank in this country which can give simultaneously to its students the great advantages of one of the world's great treasure houses of art and the benefits of one of the outstanding technical colleges of the country.

The School of Architecture was established about 1894, the eleventh among some fifty architectural schools of collegiate rank in existence today. The great value and soundness of its training is attested by a long list of capable graduates, many of them distinguished for their varied and manifold contributions to the profession of architecture.

Architecture is a fine art—the mother of arts. The practice of architecture, therefore, involves a very large proportion of the many activities of mankind. To be sound, architecture must have the assistance of the exact sciences in order that buildings may be suitable and in all ways satisfactory. That which is really fine in the architecture and the art of the past is so because it has been eminently satisfactory to people of many generations.

The Libraries

The architectural student at Armour consequently has a great advantage in having constant access to the Art Institute's splendid collections of the finest examples of art. In addition, there are readily available to him the Art Institute's two great libraries, the Ryerson Library and the Burnham. The Ryerson Library has more than 28,000 volumes, many of them irreplaceable and priceless; over 28,000 slides; and 88,000 photographs, prints, and other documents, all relating to all phases of art. The Burnham Library of Architecture, one of the best libraries of its kind in the world, has over 7,000 volumes, all relating to the subject of architecture and city planning. This library was established in 1912 through the generosity of Daniel H. Burnham, well-known architect, who designed the plan for the World's Columbian Exposition of 1892-93 and originated the plan for Chicago. Mr. Burnham provided in his will the sum of $50,000, the income of which was to be administered by prominent architects for the purchase of new books.

Besides the Art Institute's permanent collections and the libraries, temporary exhibitions of work of the artists, architects, and architectural students of the entire country serve to inspire the students and to keep them informed of contemporary thought. The regular exhibitions of drawings prepared in national architectural competitions and frequent lectures on matters relating to architecture become an additional source of stimulation.

The Objective

The objective of the Architectural Department is the effective teaching of design, the stimulation of creative imagination and a sense of beauty, and the development of the ability to think clearly and logically. Because design fundamentally involves not only beauty, but order, common sense, utility, and the suitable application of the construction sciences, this subject is very definitely emphasized in the student's course of instruction.

Instruction in Elementary Design begins in the freshman year, and is supplemented with study of Shades and Shadows, Perspective and Isometric Drawing, and practice in Drafting and Wash Rendering. The first half of the second year of Design is devoted to numerous simple problems; and during the second half of the year, the students are registered with the Beaux-Arts Institute of Design of New York.

Beaux-Arts Institute

For those unacquainted with the nature of this Institute, it may be said

Interior of Ryerson Library.

The Art Institute of Chicago, in which the Department of Architecture of Armour Institute of Technology is located.

that it was established about 1894 by a group of graduates of the Ecole des Beaux-Arts of Paris for the purpose of improving and coordinating architectural education and providing an opportunity for study to architectural office assistants. Today it provides programs for design problems to a large proportion of the architectural schools of the country and also judges the drawings submitted by the students of various schools. In this way the work of the various schools is coordinated, and the individual student is benefited by the stimulation of competition with students of other schools as well as of his own.

The study of Design, in Class B work, is continued through the junior year, and all regular students are required to do one design problem of considerable extent during the summer between the junior and senior years. The Class B design problems are varied in nature, consisting of numerous eight-hour Sketch Problems as well as problems of several weeks' duration.

Class A programs of the Beaux-Arts Institute of Design constitute the bulk of the work in the senior year; and, in addition, students of marked ability have the opportunity of competing for the Paris, American Academy in Rome, and other prizes which provide European study and travel.

In addition to being judged in national competition at the Beaux-Arts Institute of Design, the student's work is also judged locally by juries on which two or more outstanding Chicago architects are asked to serve with members of the Faculty. Students receive credit points as a result of these judgments, and when the required number have been obtained both locally and in New York, individual students are advanced in their design work regardless of the time of year.

Supplementary Courses

Modeling, Freehand Drawing, from both cast and life, and Water Color work are essential courses supplementary to design in training of the hand and of the eye, and above all in the perception and appreciation of form and composition. The work in modeling assists materially to an understanding of the third dimension, and that in drawing and color to harmony in relationship, decoration, and composition in color.

An effort is made to assist the student of architecture to an appreciative understanding of the great architecture and art of the past as a means of broadening his appreciation of the architectural problems of today and of enlarging his ability to meet them.

The architectural student's training in the application of the sciences in what some term the more practical side of architecture, begins with instruction in the fundamentals of Physics and Strength of Materials and continues through the study of Reinforced Concrete, Structural Steel Design, and Heating and Ventilating. These courses are given at the Institute, at 3300 Federal Street. Courses in Architectural Construction, Specifications, and Architectural Practice are designed to prepare the students for work in architectural offices.

The Advisory Committee

For the past year and a half an Advisory Committee, selected by Dr. W. E. Hotchkiss, President of the Institute, and consisting of the well-known Chicago architects, John Holabird. Alfred Alschuler, C. Herrick Hammond, Jerrold Loebl, and Alfred P. Shaw, has been meeting periodically for discussion and counsel in matters pertaining to the school.

The aim of the Administration, the Advisory Committee, and the staff is to make the Department of Architecture of Armour Institute of Technology the outstanding school of its kind in the country.

CHEMISTRY IN OUR DAILY LIFE

By E. P. Boynton

VAST buildings against the skyline are a common sight today. Industrial exhibits and technical journals are full of complex mazes of piping and equipment. The products of industry are everywhere about us, symbolic of the modern age and of modern technology. Most of the things that these factories produce are well known and easily recognized. The steel mills, for instance, have tangible reason for existence when we look at the employees' automobiles in the parking yard and the railroad cars and engines at work nearby. The whirring wheels of the textile mill bear meaningful fruit in the clothes we wear. Grain elevators and flour mills supply our daily bread and cake. But what of that other plant, off by itself across the tracks, with the huge tanks and mysterious aspect, that makes "Chemicals"?

The products of this plant, and the thousands of others like it, rarely show up in tangible form. Usually these chemical products disappear into the doors of other factories, and are lost in further processing. Steel and iron are always steel and iron—never hidden, but chemicals, the products of an industry fully as large as the steel industry, are well hidden and often forgotten.

Products of Chemical Industry

Where, then, can we look to find the products of chemical industry in our daily life? The list of all such places is much too long even to outline in a single article. If, however, only the organic branch of the chemical industry were to disappear overnight, and all its products with it, we should find many of our present-day comforts and conveniences gone too.

If this should happen, its effects would be apparent from the very instant that we arose next morning. There would be no soap, no shaving cream, no talc or face lotion at hand. Clothing would be an unpleasant gray color—for the dyes, which provide that eye-appeal so necessary to us, would have vanished—and the fabric would be harsh, rough, and greasy to the touch with no spinning lubricants or finishing oils and soaps. Of course rayon and artificial silk of all kinds would be non-existent, and most of our ties, socks, underwear, and all the various articles made of these materials would have disappeared.

When you are clothed in whatever you can find—including rawhide shoes, for most tanning materials as well as leather dyes and dressings are synthesized today—you then go out for breakfast. Many kinds of canned fruits and fruit juices are not available; for the interiors of all such cans must be varnished, using organic chemicals and solvents. If you want to drive your car to work, you will have to take it easy up hills and be content with less power, for anti-knock fluids are no longer in your gasoline. Your tires may go flat at any moment, for without organic chemicals for vulcanization and preventing oxidation, the rubber will last only a few thousand miles at best. The car will be bare and rusty metal because paint and lacquer depend upon chemicals. The gasoline line will leak, for the rubber connection unaided by modern synthetic materials cannot stand up against the solvent action of gasoline.

School classes could probably be carried on much the same as ever without the aid of chemical technology. The buildings would be bare and barren—no paint, no window shades, no glass, none of the modern building materials would be in evidence. The lack of color and refinements of fabric in clothing would be quite noticeable. Paper and ink would be both crude and expensive, and most of the modern sports equipment would not be in evidence—no glue, no leather, no paint or varnish, no strong and serviceable clothing could be had.

After supper, a trip downtown would reveal all the movie theaters closed because of the complete absence of film and developers. The soda fountain would serve only a limited number of confections, for most syrups and flavors, even with a natural base, depend upon synthetic color and flavor for their eye and palate appeal. The radio would not work—your receiver would probably function all right if a battery set, although without varnish and plastics it would be only a wooden box—but the transmitters would find it impossible to operate without plastics for insulation and organic liquids for condenser dielectrics and transformer core oils. The lack of these latter materials would also throw all-electric receivers out of operation, for the high-capacity, high-voltage condensers that rectify the line current would not operate without these same organic liquids.

Other annoyances would strike you as you looked around for something to replace the radio. All color would be absent from magazines, and the old-style steel pen in its wooden holder (no plastics for the barrel nor rubber for the sac would cripple your fountain pen) would write poorly and clog up from old-fashioned oak-gull ink, if you could find any at all to use.

Drugs, medicines, hospital supplies and equipment, all would be in very rudimentary shape if the contributions of organic chemistry were removed. No anesthetics, no aspirin, no sedatives, only iodine for an antiseptic, no therapeutically-valuable drugs, and only such operating equipment as could be made all-metal. All told, it would be very unsafe to be sick or injured, for even with the best of modern skill and knowledge, the doctor would have to cure you without many of his most effective tools.

So, in every line of human endeavor and enjoyment, modern organic chemistry is vital. Try to imagine, if you will, just what in your present surroundings would suddenly disappear if all such materials were caused to vanish. Everything that has come into existence through the aid of solvents, pigments, dyes, processing aids, specially made chemicals of all kinds, would be affected.

Things in Store for Tomorrow

Now that we have seen what organic chemistry does for us today, let us look briefly at a few of the things in store for tomorrow. Peering beyond the horizon is a popular sport; has been since the time of Jules Verne and before. And undoubtedly many of these long-range guesses about life in the 25th Century will come true, even as Verne's "20,000 Leagues Under the Sea" foretold many things which today are commonplaces. But there are many developments much nearer than that, on which only the final details remain to be crystallized into practice. It is these materials and processes, which will be part of our daily lives next year instead of a undred years from now, that are so ascinating to contemplate.

For instance, there is a material vailable today with which we can nake yellow pigments more powerful n color and more enduring than any ow in use. The production and application of this pigmenting material is steadily replacing chrome yellow for many pigmenting purposes. There is a process by which nitrocellulose lacquers can be mixed with water to form creamy emulsions. These lacquer-emulsions can be used to lacquer porous materials, such as paper and clay products, where present lacquers are too costly to use because they soak in too far before the surface coat will form. In these lacquer emulsions, a higher percentage of nitrocellulose can be used without having the mixture too viscous for use. With such emulsions, cheap grades of paper, even blotting paper, can be given long-wearing qualities, and a practical writing and printing surface at a total cost less than that of ordinary calendered paper.

The valuable properties of the vinyl resin plastic material together with its striking colors, make it the ideal material for a multitude of widely varied uses.

New textile lubricants are available for spinning and weaving which cause the fibers and yarns to work easier and make better textiles than the best oils, and yet these new lubricants are completely removable by cold water. No scouring or scrubbing is necessary before bleaching and dyeing, which will result in substantial savings. Other organic chemical materials, used in minor fractions of one per cent in dye and finishing baths, cause the cloth to soak up the solutions instantly and completely, resulting in smooth even penetration, level dyeing, and drastic shortening of the time required for these wet-processing steps.

Another material, an organic silicate, is a high-boiling liquid that is changed into an extremely adhesive form of silica simply by the addition of water. It is used as a preservative for hardening stone and arresting decay and disintegration. The best and most beautiful of our public buildings and monuments will surely succumb to the weather, and unless protective measures such as are made possible by this material are used, there is no satisfactory way to prevent them from crumbling to dust. This material is also excellent for coating furnace castings since it is made even more resistant by the application of heat.

There are other chemicals which are becoming available one by one, for which the complete list of uses is so long and so varied as to be almost beyond belief—even to the trained chemist. Actually, the versatility of the products now being made is so great that no one knows even a fraction of all their potential uses. There is a material that, when sprayed into a vat full of foam, will cause the foam to disappear like magic. A few hundredths of one per cent of this material is ample to conquer the most stubborn foaming. Those of you who have had bitter experiences with foaming during distillation can easily understand what a benefit this will be to paper, varnish, glue, and gelatine manufacturers. Another chemical, by virtue of its reactive structure, is at the same time the source of dyes, insecticides, pharmaceuticals, and chemicals valuable to the rubber industry.

Resins and Plastics

In the field of synthetic resins and plastics, vast strides have been made in the past decade. When we consider how omnipresent these plastic materials are, how widely they are utilized, and how necessary they are to our daily life, we are tempted to proclaim that the Age of Plastics has supplanted the Age of Steel. Three years ago, at A Century of Progress in Chicago, an entire house was shown by Union Carbide and Carbon Corporation, every bit of which was made of a vinyl resin plastic, versatile enough to be used for the walls and floors, and even the windows and dishes, all of which were brightly hued and pleasingly surfaced. That, today, is far from a mere curiosity. Already several rooms in private homes and several offices have been built entirely of the same materials, and have gained practical value as well as distinction thereby. All this progress in the realm of plastics, we can safely say, is only the beginning. Developments now in sight overshadow all that has been done to date.

Plastic materials can, in fact, now be developed almost to order. Dentures, beer-can linings, starchless collars, automobile steering-wheels, transparent cements to cushion and support glass blocks against both mechanical and thermal shock, coatings resistant to alkali and acid—all these things require special combinations of properties for a successful solution. The requirements are outlined, the chemists and technologists go to work, and a new plastic variant perfectly suited to the use for which it is intended, is the result. This is perhaps the reason why plastics are becoming so important to industry and to all of us. When a want is recognized, when a new material is needed, a new plastic will be found that fills the bill.

Safety glass ten times as strong as any now in use is being perfected. Not only will this glass be stronger, but it will not deteriorate in strong sunlight, and will retain its shatterproof characteristics in zero weather and in tropical heat. Clear transparent materials, strong yet flexible to bend around curves, scratch-resistant and workable, have already replaced glass for some airplane and certain special automobile windscreens. New paints and lacquers with unheard-of resistance to weathering, solvents, chemicals, and fumes can be formulated. Some of these coatings have almost unbelievable properties. Metal sheets can now be lacquer-coated, and afterwards stamped, drawn, spun, bent, and folded into new shapes without loosening or cracking the coating, or affecting it in any way.

Synthetic vinyl resin plastic material provided this modern porch with a beautifully colored floor covering with lasting weather resistant properties.

Cellulose Acetate Products

These special chemicals, these new materials, are by no means the whole story of modern chemistry and how it affects our life. Many of the new processes and products of five, ten, or fifteen years ago, things such as rayon, which have become indispensable to us, are fed new life through the chemical developments of today and tomorrow. Cellulose acetate—appearing in our lives as rayon, transparent wrapping materials, safety film, beautiful molded articles and lacquers—has grown from an infant industry to a lusty giant more as a result of improved raw materials than for any other single cause. Granted that cellulose acetate products have undeniable merit, yet without lowering the price to within the reach of the buying public their future was definitely limited. Plentiful raw materials, solvents, and reagents, at prices which responded favorably to increased demand have made all the difference between success and failure for this material. And improvements in technology made possible through the production of new and special water-insoluble solvents, now mean that spent acetic acid can be recovered for re-use, and presage even lower prices and wider use for cellulose acetate.

So the story goes. New chemical products mean new conveniences, better quality, increased serviceability, suitability, excellence. The contributions of chemistry are more subtle than those of steel or cement—which stand forth as bulk, framework, strength—but they are none the less real. They are the most modern that we have around us, but they are none the less necessary to life as we know it. The business of making and using chemicals is a fascinating business, and it is a good business, a satisfying life-work, because out of it comes so much of permanent value for everyone.

THE APPLICATION OF SEISMIC METHODS IN THE DISCOVERY OF NEW LANDS IN THE ANTARCTIC

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By THOMAS C. POULTER

PERHAPS no continental outline has been the subject of more speculation on the part of explorers than has that of Antarctica, and in no section has there been as much known about the surface features and so little known about how to interpret them in terms of what lies below as is the case for that area between the vertical ice wall that stopped Ross in 1841 and the Queen Maud Mountains. More flying has been done over that section and more sledge parties have traversed it than all other sections of Antarctica combined. The depth of water along its front shows very clearly that the northern edge at least is afloat, and the vast extent of comparatively smooth level surface at a comparatively low altitude has led to the conclusion that the major portion of it is afloat. The elevation of certain portions of the surface would indicate a tremendous ice depth or that it was grounded either above or below sea level.

Are these higher portions resting on an elevated portion of the underlying rock or on pedestals of ice that remain from another age when and if the ice was piled high enough to force it to the bottom over a large portion of this area, and the elevation at this point is still great enough to hold the ice on the bottom?

What produces badly crevassed areas in a region completely surrounded by comparatively smooth ice and the surface all at about the same level and the badly crevassed region extending for more than a hundred miles south from the western edge of the Bay of Whales?

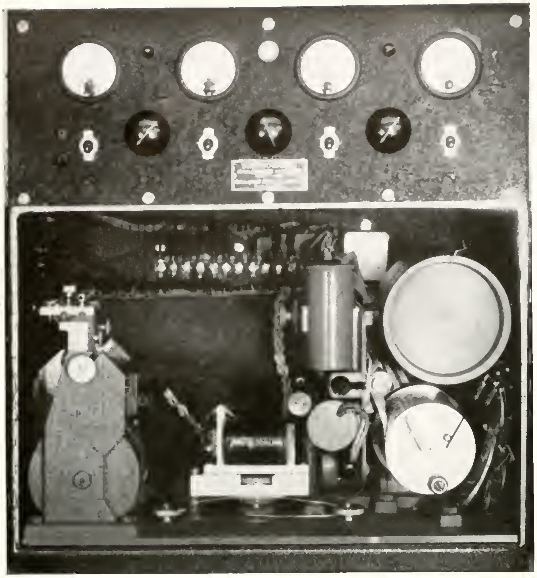
What produces such lasting features along the barrier wall as the Bay of Whales, Lindbergh Inlet, and Discovery Inlet?

How deep will the ice be forced into the water before it is melted away on the bottom as fast as it forms on top, and what is the greatest thickness of floating ice found here?

The Seismograph

These and many other questions concerning this region, to say nothing of the Polar Plateau, led us to include in our scientific equipment an instrument new in polar exploration, with the hope that we might make a start in the direction that would eventually lead to the solution of some of these most interesting problems. The equipment referred to plays a greater part in the accurate location of geologic structure in the oil fields than any other geophysical instrument.

The instrument used for our geophysical work was a *Seismograph* designed especially for those regions. For such work in the oil fields there are usually three separate parties of from three to nearly a dozen men each. The total equipment involved will normally weigh not less than five or six thousand pounds, and sometimes more. Seismic equipment on these proportions was obviously out of the question from the standpoint of weight and personnel. The limitations necessarily imposed by the fact that it would be necessary to transport the equipment over many miles of Antarctic snow and ice and operate it at very low temperatures, and the absence of dark-room facilities on the trail, presented some difficult problems of design and mounting, and the matter was put before William Green of the Seismograph Service Corporation of Tulsa, Oklahoma. Because this equipment served us so well, we being able to occupy as many stations with from two to four men operating under Antarctic conditions as are normally occupied by a full crew in the oil fields, the author has thought it advisable to include a brief description of the equipment and the procedure used. Not only were these stations occupied by a very much smaller party, but the territory covered by this survey was many times larger than that normally covered by the larger units in the oil fields. In addition to making the equipment very light, it was necessary that it be very sensitive so as to make it possible to



Seismograph, equipped with camera recorder, similar to one used on the expedition; furnished by the Seismograph Service Corpn.

stations occupied in one day was eight, and on that day we skied sixteen miles.

On one flight with the "Condon" we took off at 7:10 P. M. and returned to Little America six and a half hours later, after making seven landings on a radius of about 25 miles from Little America, occupying a station at each, and on the way back to Little America we ascended to an elevation of 16,000 feet for meteorological observations. In two subsequent flights we flew west to Discovery Inlet and south to Bolling Advance Weather Station.

In the work with the plane it was necessary that a considerably larger crew be used. The Condon plane was used for this work, which required a pilot, co-pilot, navigator, radio operator, and two or three men to operate the Seismic equipment. The navigator, assisted by the co-pilot, took sun sights with a theodolite at each station, to determine its position, and the altitude of the stations was obtained from the altimeters in the plane.

In order more closely to connect the stations occupied by the plane with those occupied in the vicinity of the Bay of Whales with dog team, the equipment was again mounted on the sled, and a series of stations were occupied parallel with the edge of the barrier and extending from the Bay of Whales to Discovery Inlet, where a rendezvous had been arranged with the Bear, as it returned to Little America. Many of the problems connected with the Ross Shelf ice do not come within the scope of this paper and will be the subject of subsequent articles by the author.

The proper interpretation of seismic records in such a region where none of the characteristics is known is predicated upon having a series of stations extending from a region of known conditions to the region where information is desired. For this purpose we started our series of measurements on the relatively thin ice on the Bay of Whales where the thickness of the ice and the depth of the water under the ice were known. Then, after having determined the velocity of sound in the various forms of snow and ice, and in sea water at the temperature and salinity existing there, we were ready to start an extensive survey. While there is still a great deal of information that can be obtained from these data, several very significant facts have already been obtained.

There was a section of high barrier somewhere to the southeast of Little America that had been known since Amundsen's time, but no one had any very definite knowledge as to the elevation of the surface or its extent. Numerous flights across it fairly definitely fixed its position and determined its size to be much greater than had been supposed, being about one hundred miles north and south by nearly forty miles east and west. Subsequent seismic surveys of this region showed it to have an elevation in places of more than 1,400 ft. and supplied the first scientific proof that the land was actually above sea level. Perhaps this is the first island whose existence has been established and whose boundary has been outlined and elevation determined without the island ever having been seen. The island was named Roosevelt Island after President Franklin D. Roosevelt.

Seldom has a new method of exploration been adopted with the expectation of adding to the known land surface of the earth but that it has shown the non-existence of reported land areas. The Seismic method is no exception in that respect, for Prestrud Island (L. M. Gould, *Bulletin of the Geological Society of America,* Vol. 46, pp. 1367-1394) on which Gould explains the existence of the Bay of Whales probably is not an island in the sense that it extends above sea level. If the ice is grounded in that region it is likely at a considerable distance below sea level, for a sounding on the northern portion of this supposed island shows the bottom to be more than a thousand feet below sea level with a bottom that is increasing in depth as it goes south at the rate of about 20 feet per mile, as indicated by stations North, West, and South of that point.

Seismic methods are now being used for a great variety of purposes such as building, ship and airplane structures, and a great variety of other structural designs. A recording Seismograph of the type used in the Antarctic and suitable for studying structural vibrations will be available in the near future for work in the Research Foundation of Armour Institute of Technology.

ELECTRONIC MUSICAL INSTRUMENTS

By Earle L. Kent

WITH ever increasing momentum, as is indicated by patents, technical papers, popular articles, and commercial projects, engineers are becoming more and more interested in the progress of the musical art. Though there was evidence of some such interest forty or more years ago, it has been only in the past five or six years, that any widespread effort has been made to bring music in step with the rapid progress of other arts and fields of human endeavor.

At present, hundreds of engineers, both in the United States and in foreign countries, are busily engaged in an effort to produce an ideal, or nearly ideal, musical instrument. Their task is not an easy one, even with all the scientific information now at hand, for they have to combat not only mechanical, electrical, and acoustical problems, but also the reactionary prejudice of the professional musicians and the traditions that are held so high in the production of music.

The limitations and disadvantages of the various traditional instruments have been recognized and accepted by the musicians and music lovers for hundreds of years, but very few changes have been made to correct or overcome them. The composers and arrangers have had to keep these limitations in the instruments for which they write constantly in mind. And yet, in spite of the fact that those who write the music, those who play it, and those who listen are trained in these shortcomings, soul stirring music has been produced. But we can only guess the new heights and depths that may be opened to the composer in penning his thoughts with these limitations reduced to a negligible factor and to the musician in interpreting those thoughts with physical contortions reduced and with a vastly greater range of tones and expression at his command.

The Engineer's Problem

It is the problem of the engineer to produce a practical instrument that will make possible this new realm of tone, range, and flexibility.

Since the organ is the most useful form of the present instruments, it is upon an instrument of this type that attention will be focused. The aim is not merely to produce a pipe organ without pipes, but to create an instrument to be played in a manner similar to that of the organ, but with infinitely greater capabilities than any known instrument. Engineers feel that such an instrument is possible by electronic methods and with far less complexity, weight, bulk, and cost than by others.

Limitations that make such an instrument difficult are not in the design of amplifiers and loudspeakers for the amplification of electric waves and translation of these into sound, but in the generation and control of the electric waves in the first place. Of course, the design of the amplifiers and loudspeakers is very important in an electronic instrument, but this phase of the work has been already developed to a high degree in radio and talking pictures. Therefore, the chief problems lie in the development of a means for generating electronically a large number of tones in a small space, with a minimum complexity, and in a manner lending itself to flexible control of the tones.

There are at present several types of electronic instruments that have been publicly announced. However, none of the instruments has been accepted by the majority of organists. In their professional magazine, *The American Organist,* a recent questionnaire revealed that not one of the leading organists in the country, of those answering, considered the electronic instruments in any way a satisfactory substitute for the pipe organ. In June, 1936, The American Guild of Organists published the statement that the tone of the pipe organ has never yet been successfully imitated by any other method of tone production. However, in spite of defects which admittedly exist, the retail sales in the United States for electronic musical instruments in 1936 were in excess of two million dollars.

Types of Electronic Instruments

Electronic musical instruments an-

Hammond Organ, using the electro-magnetic type of tone generation.

Eremeef Organ, of the photo-electric type.

nounced to date may be classed as purely electronic, electromechanical, or electrically amplified.

Purely electronic instruments contain a unit or units for generating tones of simple or complex wave form by the use of vacuum tubes, neon tubes, or any such devices not requiring moving members in their functioning. A "simple" tone is one of pure flute-like quality as produced by a vibrating tuning fork. Such a tone has a sinusoidal wave form. A tone of "complex" quality timbre, or wave form, is such a one as is produced by a trumpet, clarinet, horn, etc.

Electromechanical instruments depend upon mechanical movement such as rotation, vibration, or linear motion in the generation of the electric impulses or waves. These are then amplified by a vacuum tube amplifier and then transduced by a loudspeaker. Such an instrument may be either of the tone producing type or the tone reproducing type. If it is the first, the tones are actually generated by electrostatic, electromagnetic, or photoelectric means without depending upon sound recordings. The second has tones of predetermined timbre, or quality, recorded photographically, magnetically, or mechanically, which the musician causes to be reproduced as he plays the instrument.

A conventional or a miniature musical instrument may be equipped with a means for picking up the tones, such as a microphone or other pickup device, and an amplifier. The tones thus electrically amplified make many new and pleasing effects possible.

Each of the types of instruments mentioned has its inherent advantages and disadvantages, but it would require considerably more space than this to discuss any particular type in detail. All types approach the ideal, and if the desirable features of all types were combined in one instrument it might be considered ideal. Such an instrument must necessarily evolve as a result of the pioneering that is being done and is yet to be done in the electronic musical instrument field.

Special Features

Engineers in this field are giving particular attention to such features as the abruptness with which tones are initiated and terminated, tremolo control, choral effects, timbre formation, consoles which meet the specifications of the American Guild of Organists, and many other niceties appreciated and in some cases demanded by the professional musicians.

Since it is undesirable that tones start and stop instantaneously, as is the case if the sounding of the tone is directly dependent upon the closing and opening of an electric circuit, various precautions are taken at least partially to prevent this. In some instances it is possible not only to prevent undue sharpness in tone "attack" but to control it in order that either staccato or legato passages may be properly played.

There is some question as to how the tremolo should be produced. It may be produced by doing one or both of two things. First, its tone may be caused to waver in pitch about a point intended to be heard as the definite pitch. Second, the tone may be increased and decreased in intensity or loudness, the pitch remaining constant. Both methods are used in pipe organ and in electronic organ practice. Regardless of which is used, the tremolo effect should be the greatest on the higher pitch tone and with less movement of bass tones.

All electronic organs having mechanically- or electrically-driven moving parts for tone generation are at an advantage in that they stay in tune, but are at a serious disadvantage in the production of choral or celeste effects. The choral effect is obtained in a band orchestra or chorus by having more than one instrument or voice playing or singing in unison. Since it is not likely that each instrument or voice is producing identical tones in timbre or even in pitch, a warm depth results. Without this effect the music is cold and tiresome.

In order that the serious student of the pipe organ, one who has been trained to use a console meeting the standard specifications of the American Guild of Organists, may not be put to additional disadvantages by finding new measurements and placement of the keys, stop tablets, pedals, etc., it is desirable that as many of these standards as possible be met in the design of an electronic instrument.

In the future, electronic musical instruments may be designed to be played by more than one person with amazing results. Perhaps with the development of electronic organs and color organs it will be possible to paint undreamed of pictures in light and sound.

To say the least, we can expect a steady progress in the field of electronic music, and just where it will end nobody knows.

THE TELETYPESETTER

ITS DEVELOPMENT AND APPLICATION

●

By M. T. Goetz and E. S. Larson

"TELETYPESETTER" may be briefly described as apparatus for automatically controlling the operation of linecasting machines through the medium of perforated tape containing a permutation code. It consists essentially of two units: 1. The Teletypesetter perforator, which is operated like a typewriter to prepare the tape; 2. The Teletypesetter operating unit, which is attached to the linecasting machine and is controlled by the perforated tape, performing the necessary functions to cast lines of type of exact column width.

The perforated tape may be passed through printing telegraph transmitters to send the permutation code to distant points where duplicate tapes may be prepared on Teletype reperforators for use in operating linecasting machines at the distant stations. Typewritten copies of the messages may be simultaneously recorded on Teletype printing telegraph printer sets.

News of world events, which each day reaches a focus in our daily newspaper, is carried from the point of origin by all means of communication, including the radio, the telephone, commercial cable and telegraph agencies, press telegraph networks, and transportation agencies from the most primitive to the most modern. Whatever methods may have been required in transit, the news dispatch is usually recorded in American newspaper offices in the form of typewritten copy prepared by a Teletype printer. The copy is edited and sent to the composing room, where it is set in type by manual operation of linecasting machines. Shortly thereafter it appears in printed form in the newspaper, and thereby completes a cycle which may have begun a few hours before, half-way around the world.

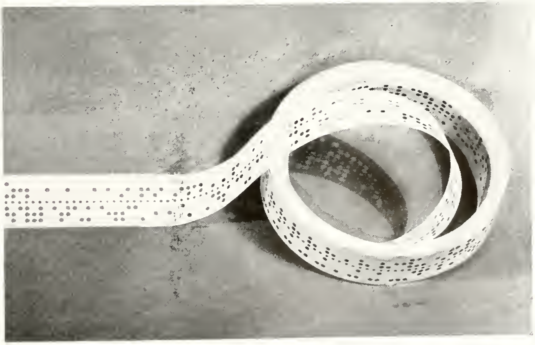
The machines and systems which perform this daily task are widely used and are so reliable that their performance is considered commonplace. Yet, in spite of present performance, there is a continual urge for improvement which results in a succession of advances, and occasionally produces a new system of particular merit. Among the latter is Teletypesetter.

Teletypesetter is a system of typesetting which extends basic principles of printing telegraphy to a new field, namely, automatic operation of linecasting machines. It provides a method of producing large quantities of type with economy and speed. The remainder of this article will deal with commercial Teletypesetter equipment and with the more interesting problems encountered in its development.

In 1886 the Linotype linecasting machine was introduced to the printing industry as a means of producing type in the form of slugs or "lines of type" in which the raised characters and the supporting body were cast of type metal in a single unit. This method of type production reduced the cost of type and rapidly replaced hand typesetting methods then in use. With more type available at lower cost, all related printing processes were rapidly improved, and the printing industry entered a period of expansion which is still in progress. Today more than fifty thousand linecasting machines in use throughout the world supply most of the type required by the job printer and practically all of the type required for the daily newspaper.

The linecasting machine is a specialized form of die casting device in which the mold for a line of type consists of (1) a rectangular cavity which forms the body of the slug, and (2) a line of individual character molds which are presented to the open edge of the cavity in metal tight lockup to form the raised printing surfaces on the finished line of type. The small character molds are indentions carried by individual brass matrices, which are released from a storage magazine by manual operation of keys on the linecasting machine keyboard. These matrices are automatically assembled in the order of their selection by the operator. Between selection of groups of character matrices representing words, the operator strikes the space band key which provides the spaces between the words.

Fig. 1. Roll of tape perforated with Teletypesetter Code.



In printed matter, as contrasted with typewritten material, most lines are exactly the same length. The process of making them so is called 'justification", and the expanding space bands are what make it possible. Each space band has a maximum, fully expanded thickness and a minimum, unexpanded thickness. When the linecasting machine operator is assembling the line, he must judge whether or not it will justify before delivering it for the automatic casting operation. In the casting operation, each space band is expanded exactly the same amount until the line completely fills the column width. After the metal cools, the slug is trimmed to the proper height and thickness, and ejected to a galley where successive slugs are collected to form a column of type. Meanwhile the brass matrices are automatically distributed back to the magazine channels from which they were taken, so that they may be used again. The space bands are likewise returned to their storage magazine.

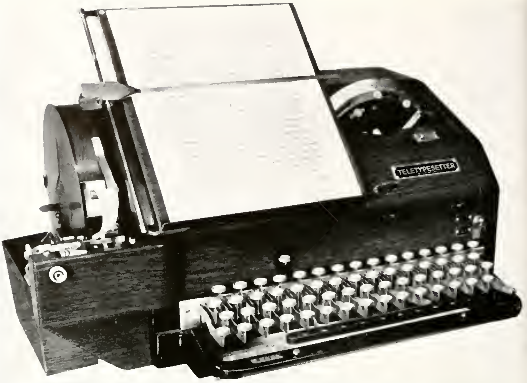


Fig. 2. Teletypesetter Perforator with cover.

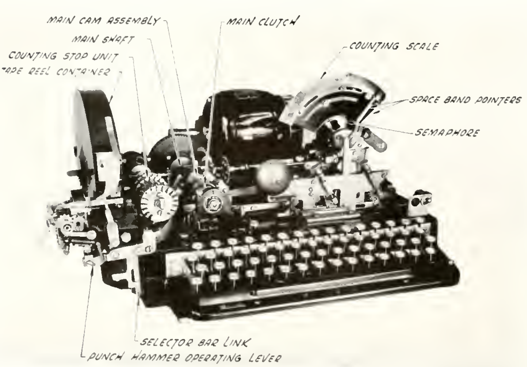
From the above description, it is evident that manual operations required to control a linecasting machine are limited to manipulation of the keyboard and raising of the assembling elevator when a line of matrices has been assembled. The Teletypesetter operating unit performs these functions automatically under the control of a perforated tape, and thereby converts the expensive, space-consuming linecasting machine into a completely automatic unit capable of continuous operation at maximum capacity.

Control tape for the operating unit is prepared on the Teletypesetter perforator, which is a separate portable unit equipped with a high speed keyboard arranged like that of a typewriter. Separation of the keyboard operation from that of the linecasting machine has several advantages. The perforator operators may work in office surroundings which are more conducive to concentration with resulting accuracy and speed. In addition, the use of control tape provides great flexibility, since the tape may be prepared at any desired time, in any desired location; may be stored indefinitely, duplicated easily, used a number of times, transported easily; and, if desired, it may be reproduced by telegraph at any number of distant points by means of standard Teletype printing telegraph apparatus.

The control tape used is practically identical with the tape which has been used for many years in the printing telegraph field, and the Teletypesetter selection code is also based on the standard printing telegraph code, with necessary modifications to permit selection of the additional characters required for complete automatic operation of a linecasting machine by the Teletypesetter operating unit.

A roll of Teletypesetter tape is shown in Figure 1. In each 0.1 inch length of the tape, a feed hole and a maximum of six code holes may be perforated. The feed hole is invariably present and engages the feed wheel on the operating unit for the purpose of advancing the tape step-by-step through the unit as the successive code combinations are sensed by tape feelers in the operating unit. The code holes may be punched in various permutations as shown in Figure 1, corresponding to the various characters and functions to be selected on the linecasting machine. The six-unit code provides sixty-four permutations, two of which are assigned to shift and unshift selections, comparable to the two printing positions on a typewriter, so that each of the sixty-two remaining permutations may control two different selections. Thus, a total of 124 different selections is made possible by the Tele-

Fig. 3. Teletypesetter Perforator with cover removed (showing operating structures).



typesetter code. Since only ninety-one are required for operation of the linecasting machine keyboard, it is apparent that an adequate number remain for control of the several functions of the linecasting machine and for controlling printing telegraph apparatus associated with wire transmission.

Type used in printed matter differs from that used on the typewriter. All typewritten characters occupy the same space in the line regardless of character proportions, but printed characters occupy differing amounts of space. For example, lower case "m" is about three times as wide as lower case "i", and about one and one-half times as wide as lower case "a". For this reason the counting mechanism provided on the perforator is arranged to move a counting pointer varying distances over the counting scale in proportion to the widths of the characters being selected by the operator. In actual practice the counting pointer starts from a setting equivalent to the column measure and moves to the right toward zero, thus indicating at any time the remaining part of the line which must be filled with character matrices or space bands. Each time the space bar on the perforator is operated, two space band pointers deflect, the left-hand one moving a distance proportional to the maximum thickness of the space band, and the right-hand one a distance proportional to the minimum thickness of the space band. Since the right-hand pointer is fixed to the sliding counting scale, and thus moves it to the left (opposite to the motion of the counting pointer), the reading of the counting pointer on the scale is reduced to an amount proportional to the width of a line containing unexpanded space bands. It can be seen, therefore, that the line will justify when the counting pointer moves within the range defined by the two space band pointers. If the counting pointer is to the left of the left space band pointer, the expansion of the space bands will not be sufficient to expand the line to column measure, and if the counting pointer moves beyond the right-hand space band pointer, the line will be too long to fit the column width. In brief, the operator must finish the line at the end of a word, or with a correct word division, and with the counting pointer between the two space band pointers. When this condition is obtained the operator strikes special keys which return the pointers to their initial position, and perforate in the tape the permutations which control the delivery of the completed line to the casting mechanism on the linecasting machine. The key arrangement on the perforator is very similar to that of a typewriter, and covers an area only a small proportion of that covered by the linecasting machine keyboard. Also, the pointers definitely show at any time whether the line will or will not justify, and this eliminates the necessity of making frequent judgments during the assembling operation, as is necessary in the manual operation of the linecasting machine.

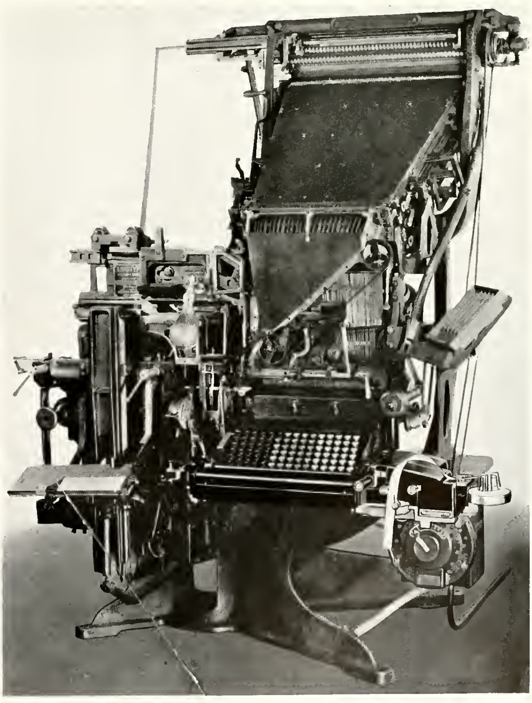
Much development effort was devoted to methods of supplying this justification information to the operator, and many systems were tried in actual service before the present apparatus was placed on the market. The present system, using three pointers moving over an accurate counting scale, provides the operator with a graphical indication which requires but a glance to determine the justifiability of a line. The simplicity of this indication minimizes the lost time at the end of each line, and allows the operator to take full advantage of the high speed keyboard.

As the tape is perforated, it is usually collected on a tape winder until a roll like that shown in Figure 1 has been accumulated. The completed rolls are then placed on the unwind reel of the operating unit, from which it is fed to the unit to accomplish automatic control of the associated linecasting machine.

Figure 4 shows the operating unit installed on a typical linecasting machine. Before the unit can be installed, the linecasting machine must be equipped with a special keyboard which retains all of the operating

(Turn to page 34)

Fig. 4. Teletypesetter Operating Unit attached to Linecasting machine.



NEW TRUSTEE

JOHN P. SANGER, our most recently elected trustee, graduated from Armour Institute of Technology in 1921 and went directly to work with the United States Gypsum Company as an Assistant Buyer. As the years passed, he moved steadily along, occupying in succession the positions of Buyer, Assistant Purchasing Agent, Purchasing Agent, and, finally, Director of Purchases. In 1936, at the age of 35, he was elected Vice-President.

Mr. Sanger has been actively interested in purchasing work not only in the U. S. Gypsum Co. but also in the Purchasing Agents Association. He has held the position of President of the local organization, and is at present a Director of the national society.

Mr. Sanger is a golf enthusiast, and a member of the Union League Club.

RECENT ADDITIONS TO THE FACULTY

DR. O. A. HOUGEN, nationally known authority on unit processes in chemical engineering, comes to Armour from the University of Wisconsin, where he was professor of chemical engineering.

Photo by Monfort

Olaf Andreas Hougen

Born in Wisconsin of Norwegian parents, he traveled westward with his family, attending high school in Tacoma, and graduating in 1915 from the University of Washington. Returning to his native state, he received his Master's degree in 1918 and Doctor's degree in 1925 from the University of Wisconsin, the institution with which he has been connected in a teaching capacity since 1917, except for the year 1918-19, when he was at the United States Chemical Plant No. 4 at Saltville, Virginia, as chemical engineer, and the year 1934-35, when he was Director of Laboratories, at the U. S. Testing Co., Hoboken, N. J.

Dr. Hougen has been appointed Professor of Chemical Engineering, and he will serve also as Chemical Engineer in the Research Foundation. He has been associated with many commercial firms as consultant, and he is the author of numerous articles. He is a member of the Amer. Chem. Soc., S.P.E.E., and the Amer. Inst. of Chem. Engineering. He is also a member of the honorary scholastic societies, Phi Beta Kappa, Phi Lambda Upsilon, Tau Beta Pi, and Sigma Xi.

* * *

DR. MAX JAKOB, German scientist, and international authority on heat transfer, has been appointed to the staff of the Research Foundation as Director of the new heat exchange

(Turn to page 26)

Max Jakob

A CHURNING flood had taken out the telephone line across a Colorado stream. Repairmen couldn't wade it because of quicksand—couldn't cross elsewhere and bring back the line because of obstructions.

Then Kayo's master had an idea. He went upstream, crossed, came back and whistled. Kayo jumped in—swam across with a cord tied to his collar. With this cord, the wire was soon pulled over—communication was restored.

A small incident. But it typifies the ingenuity which helps Bell System men and women to give you the world's most dependable telephone service.

BELL TELEPHONE SYSTEM

Why not telephone home more often? Rates to most points are lowest after 7 P. M. and all day Sunday.

FACULTY

(From page 24)

laboratories.

Dr. Jakob, who was in the United States last spring on a lecture tour of major engineering institutions and engineering societies, is well known here for his research in steam and calorimetric experiments on latent heat and volume of saturated steam at high pressures, evaporation and condensation.

Until his retirement in 1936, Dr. Jakob was scientific advisor of the Society of German Engineers (VDI) and editor of their publications, and professor and member of the German Government Institute of Applied Physics. He has been Director, since 1922, of the German Government's Laboratory of Thermodynamics and Hydraulics, and of the Laboratory for Viscometry and Petroleum Apparatus, and Chairman of the Society of German Engineers' committee for Heat Engineering Research.

Dr. Jakob holds several degrees from the Technische Hochschule, Munich, Germany.

* * *

MR. CHARLES L. TOWNE, Instructor in English, is a native of North Dakota. In 1923 he left the University of Oregon to work on the *Cleveland Times* as a reporter. After two years he returned to the University, obtaining his Bachelor's degree with honors in 1927. The following year he received a Master's degree from the University of St. Louis, the title of his thesis being "Seventeenth Century Verse Satire." From 1928 to 1931, Mr. Towne was Instructor in English at the University of Kansas, and subsequently at the University of St. Louis. Since 1935 he has been an Editor on the Federal Writers Project, engaged in writing a history of Chicago. He has lectured widely on contemporary literature.

Mr. Towne is completing his thesis for his Doctor's degree at the University of Chicago.

Photo by Monfort

Charles L. Towne

Photo by Monfort

C. M. Wolfe

* * *

DR. C. M. WOLFE has been appointed Assistant Professor of Electrical Engineering.

Graduating from the University of West Virginia in 1925, Dr. Wolfe spent two years in industry, the first as electrician for a mining corporation and the second as test engineer for a public utilities company, before taking up advanced study at the California Institute of Technology, from which he received his Master's degree in 1929 and his Doctor's degree in 1932.

Dr. Wolfe comes to Armour from New Mexico State College, where he taught physics and electrical engineering. He has been engaged in some interesting research work, having designed an optical oscillograph for measuring lightning currents and investigated the electrical dehydration of crude oil emulsions.

He is a member of the honorary scholastic fraternities, Siga Xi and Tau Beta Pi and the professional society, Amer. Inst. of Elec. Engineers.

I find the GREAT THING in this world is not so much WHERE we STAND as in what DIRECTION we are moving.

—Oliver Wendell Holmes.

We shall prosper as we learn to do the common things of life in an uncommon way.

—Booker T. Washington.

* * *

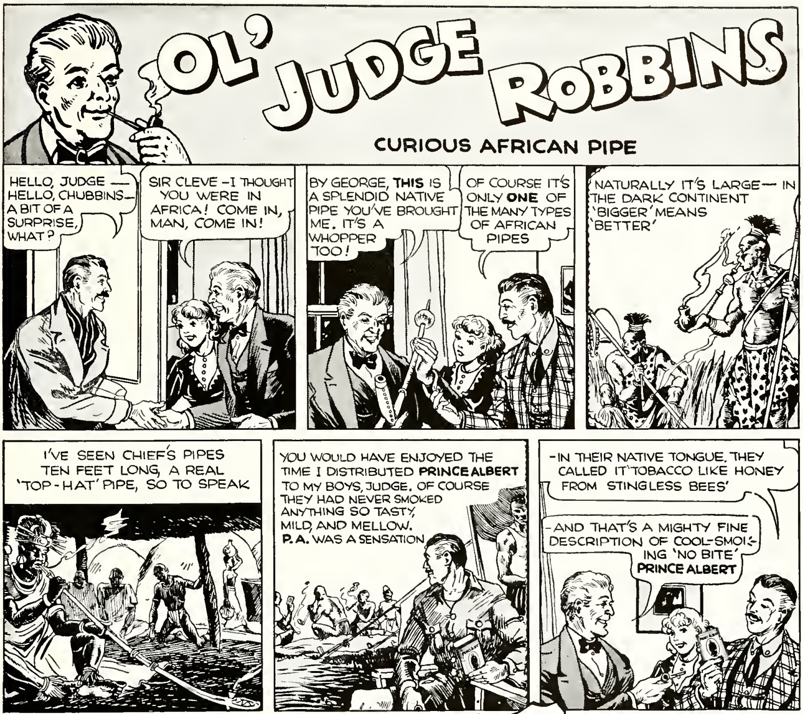
DR. G. E. ZIEGLER was born in Chicago and received his early education in the Chicago public schools. He comes to Armour as a member of the Research Foundation in charge of the new X-ray laboratory and as Assistant Professor of Physics. Dr. Ziegler's specialty is X-ray analysis and crystalography.

In 1925 Mr. Ziegler entered the University of Chicago and received his B.S. degree in 1929, his M.S. in 1930, and his Ph.D. in 1932. Physics, X-rays, and crystalography, constituted his major fields of study. He is a pioneer in the X-ray study of sodium, potassium, and lithium nitrites, his work on these crystals being the first of its kind. He has published several articles, most of them in German, on the subjects of his research.

Before coming to Armour, Dr. Ziegler taught physics and mathematics at the Central Y. M. C. A. College. He is a member of Sigma Xi, the American Physical Society, and the Amerian Association of Physics Teachers.

Photo by Monfort

George Eliott Ziegler


OL' JUDGE ROBBINS
CURIOUS AFRICAN PIPE
HELLO, JUDGE — HELLO, CHUBBINS— A BIT OF A SURPRISE, WHAT?
SIR CLEVE —I THOUGHT YOU WERE IN AFRICA! COME IN, MAN, COME IN!
BY GEORGE, THIS IS A SPLENDID NATIVE PIPE YOU'VE BROUGHT ME. IT'S A WHOPPER TOO!
OF COURSE IT'S ONLY ONE OF THE MANY TYPES OF AFRICAN PIPES
NATURALLY IT'S LARGE— IN THE DARK CONTINENT 'BIGGER' MEANS 'BETTER'
I'VE SEEN CHIEF'S PIPES TEN FEET LONG, A REAL 'TOP-HAT' PIPE, SO TO SPEAK
YOU WOULD HAVE ENJOYED THE TIME I DISTRIBUTED PRINCE ALBERT TO MY BOYS, JUDGE. OF COURSE THEY HAD NEVER SMOKED ANYTHING SO TASTY, MILD, AND MELLOW. P.A. WAS A SENSATION
-IN THEIR NATIVE TONGUE, THEY CALLED IT 'TOBACCO LIKE HONEY FROM STINGLESS BEES'
-AND THAT'S A MIGHTY FINE DESCRIPTION OF COOL-SMOKING 'NO BITE' PRINCE ALBERT

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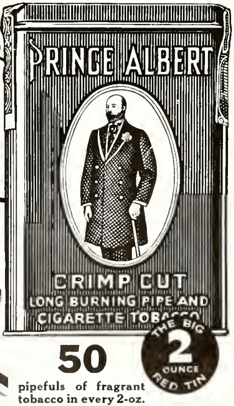
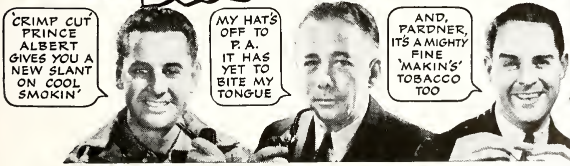
(Signed) R. J. Reynolds Tobacco Company, Winston-Salem, N. C.

PRINCE ALBERT THE NATIONAL JOY SMOKE!




'CRIMP CUT' PRINCE ALBERT GIVES YOU A NEW SLANT ON COOL SMOKIN'
MY HAT'S OFF TO P. A. IT HAS YET TO BITE MY TONGUE
AND, PARDNER, IT'S A MIGHTY FINE 'MAKIN'S' TOBACCO TOO

50 pipefuls of fragrant tobacco in every 2-oz. tin of Prince Albert

WHAT'S GOING ON

CO-OPS SMOKER

The cooperative students held their first get-together since the inception of the cooperative classes in the form of a smoker at the Lawson Y. M. C. A., December 11, 1936. Dr. Poulter's moving pictures of the Antarctic were the main feature of the evening, with swimming, ping pong, and other forms of recreation occupying the remainder of the evening.

* * *

FRESHMAN CLASS ELECTS OFFICERS

The first freshman class at Armour to delay its selection of officers until the men had become better acquainted with one another and were in a position to choose more intelligently made known its will the latter part of December. The officers are: Paul Ransel, president; Donald Sunde, vice president; Roy Brinkman, secretary; Lloyd Norkus, treasurer; Eugene Worcester, social chairman; and Larry Stedman, A. T. S. A. representative.

* * *

ARMOUR EYE

E. P. Mehringer was elected president of the "Armour Eye," the newly organized photographic club. Other officers elected were: F. M. Widell, vice-president; A. N. Fried, secretary; and P. J. Stanley, treasurer.

* * *

X-RAY LAB

The Research Foundation has started work on the expansion of its present quarters. X-ray and spectroscopic laboratories are to be added. Dr. Ziegler is to have charge of these new labs.

* * *

SCHOLARSHIP AWARDS

Because of the unusual ability of the applicants, six instead of five full year scholarships were awarded by the Freshman Scholarship Committee. The winners of the six scholarships are: Sidney Heenan, McKinley; Donald Long, Amundsen; Robert Mead, Senn; Lee Niems, Austin; LeRoy Noakes, Englewood; and Alvin Winkler, Fenger.

* * *

ARMOUR PLAYERS PERFORM

On January 22 the Players' second production of the year, "The Quarry," was presented. Rapid action was the keynote of the play. Never once did the movement of the plot lag. Mr. Fulghum, the Players, and the technical staff are to be congratulated on presenting such an entertaining play.

* * *

HONORARIES BANQUET

About one hundred of the school's outstanding students were guests at the Interhonorary banquet held February 15 at the Adventurer's Club. The fraternities represented were: Tau Beta Pi, Pi Tau Sigma, Chi Epsilon, Phi Lambda Upsilon, Eta Kappa Nu, Salamander, Sphinx, Pi Nu Epsilon, and Honor A.

* * *

JUNIOR FORMAL

Swinging to the scintillating music of Bill Hogen's band, the class of '38, looking its best in formal dress, entertained in royal manner at the Junior Prom in the Drake Hotel on February 12. In defiance of tradition the affair was held during the winter social season rather than in May.

* * *

NEWS STAFF

Landrith B. Parker and James D. Sheehan were named co-editors-in-chief of the *Tech News* at the annual News banquet. The new editorial board, selected to assist the co-editors, is as follows: W. J. Chelgren, news editor; A. N. Schreiber, copy editor; and R. A. Braun, sports editor.

* * *

DEANS WELCOME FRESHMEN

One hundred and eighteen incoming students were welcomed to the Institute by Dean H. T. Heald on February 11. Assistant Dean C. A. Tibbals then spoke to the new men about the various organizations and traditions at Armour.

* * *

FEBRUARY ASSEMBLY

Dr. F. F. Shannon presented an inspiring address at an assembly held February 24 commemorating the birth of Abraham Lincoln and George Washington.

* * *

FACULTY CLUB

At the last meeting of the Faculty Club, officers for the coming semester were elected. Professor W. A. Spencer was chosen president and will be assisted by Professors Nachman and Ensz, who were elected vice-presidents. Professors Floyd Van Atta and Arthur Sear are the new secretary and treasurer, respectively.

SOPHOMORE INFORMAL

The splendor of the Knickerbocker's Oriental Room, the velvety rhythms of one of the mid-west's best dance bands, and the geniality inspired by real enjoyment, made the Sophomore informal a great success.

* * *

MUSICAL CLUB CONCERT

Featuring a program of musical numbers including modern extravaganzas, the classics, and both instrumental and vocal solos, the Armour Tech Musical Clubs, O. Gordon Erickson directing, played and sang to a capacity audience at the Goodman Theatre on February 25. The concert was sponsored by the Women's Faculty Club.

* * *

FRESHMAN SCHOLARSHIP EXAMS

As in previous years, ten one-year scholarships will be awarded to graduates of accredited high schools. The basis of the awards will be competitive examinations in mathematics, physics, and chemistry, held on Saturday May 22, at 9:00 a. m. Interviews will take place between March 1 and May 20.

* * *

NEW SHOP COURSES AND EQUIPMENT

In getting away from the traditional "manual-training" courses, Armour has been securing the latest types of equipment in order to present the most modern of industrial practices.

New lathes have been installed. and the new turret-top is being awaited. With the arrival of a new electric welder, all the important types will be available for use. Shop work is being eagerly sought, and several new courses have been added.

* * *

ARMOUR RELAYS

The Armour Relays, one of the biggest track meets of the indoor season, is scheduled for Saturday, March 20, at 7:00 p. m. The relay festival will be run in the University of Chicago Fieldhouse on one of the fastest tracks in the country.

Last year, 35 universities and colleges sent 400 men. Many records were broken, and more will go this year. Cups donated by Armour alumni, will be presented to the three high-point men of the meet, and medals will be awarded to winners of individual events and to the victorious relay teams.

FRATERNITY NOTES

Taking first place in every event, the *Phi Kaps*, led by Havlicek, swept the annual interfraternity swimming meet on January 13 in one of the most decisive swimming victories in recent years. Second and third places were taken by the *Phi Pis* and *Rho Delts.*

Among the fraternities which took advantage of the Christmas vacation were *Alpha Chi Sigma,* which held a well-attended smoker, and *Rho Delta Rho* with its Christmas party on December 26. Members of *Sigma Alpha Mu* saw "It Can't Happen Here" at their Christmas dinner and theatre party. Between the semesters, *Theta Xi* held a dance at Thorne Hall on the McKinlock campus of Northwestern University and on February 27 had a hard times party. On February 20 the alumni of *Pi Kappa Phi* held a Monte Carlo party. The *Triangle* alumni association held its annual banquet on February 20.

Many alumni of *Theta Xi* were present at the quarterly house dance party on December 12. At the joint meeting of the professional chapter with the Northwestern and Armour chapters of *Alpha Chi Sigma,* P. R. Schultz was awarded a charm as the most efficient reporter of all the fraternity chapters. A number of members of *Delta Tau Delta* attended the regional conference at Madison on February 25.

Phi Pi Phi had its semi-annual Sunday dinner on December 13 and a pledge dance on February 6. Members of *Delta Tau Delta* had a toboggan party on January 23 at Palos Park, but *Rho Delta Rho's* entertainment on February 6 took the form of a splash party. *Sigma Alpha Mu* is planning a splash party for March 13.

Four sophomores, six juniors, and three seniors were initiated to *Alpha Chi Sigma* on January 19. A dinner theatre party was held for the initiates on March 11. In ceremonies held recently, twelve men were initiated to *Delta Tau Delta.* Eight were initiated to *Phi Pi Phi* on February 20, and on February 25 *Phi Kappa Sigma* also formally initiated eight men. *Pi Kappa Phi* held its initiation of eleven men on February 28, followed by a banquet at the chapter house.

The interest shown by most of the fraternities in the interfraternity basketball indicates that the *Phi Pis* will be given keen competition in trying for their eighteenth consecutive victory. Many fraternity men are also looking forward to the interfraternity bowling tournament which is being planned. Final plans for the Interfraternity Formal Dinner Dance to be held on April 17 are being made, and a very successful event is anticipated.

REPORT INCREASED MANUFACTURING COST IN SHOE TRADE
In making adjustments in wages on the basis of changes in the cost of living, it was announced today by the shoe trade, the manufacturing cost of shoes will be noticeably increased. The adoption of this plan was reported as being considered by several companies
TANNERS ANNOUNCE PRICE ADVANCE
LEATHER PRICES ADVANCE SHARPLY
SHOE PRICES FORCED UP IN MATERIAL RISE
BUY NOW
Beat the Rise!

THIS NEWS is in the headlines . . . there's no denying the fact that, with the cost of material rising, the price of shoes must go up, too.

We've fought—and fought hard—to keep the price of these popular calfskin oxfords at $4. And we've done it . . . for the present!

So buy NOW . . . beat the RISE . . . and SAVE!

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SPORTS

BASKETBALL

The basketball team has just completed its first season under its new coach, Grant Stenger. They won eight of the fifteen games played. Considering the fact that three of the regulars were unable to play in a number of games because of injuries, the team had a successful season.

Captain Heike, Merz, and Shukes will be lost by graduation, but it is hoped that their places can be filled next year. Bill O'Brien and Jack O'Connell have been elected captains for the 1937-38 season. Following is a brief resume of this year's games.

The Techawks opened the season on Dec. 3, by defeating De Kalb 29-25. Although the tall De Kalb squad kept the ball under their basket most of the time, Armour had control of it long enough to get the points that decided the game. De Kalb began a rally in the last few minutes of the game, but could not carry it through.

Armour won their second game by whipping the traveling Arkansas State team 37-28. The first half which ended 13-12 in Armour's favor, was very closely contested, with good guarding by both teams. The Techawks gradually pulled ahead in the second half, and were not seriously threatened for the rest of the game. Heike took scoring honors with 15 points.

Lake Forest handed the Tech squad their first defeat of the season at Lake Forest on December 12. This was one of the most thrilling games of the season, the count seesawing back and forth, with neither team ever leading by more than four points. In the last 45 seconds with the score 32-31, Armour missed a free throw which Lake Forest passed down for a basket to win 34-31.

Beloit was the next team to visit the Armory, and while there defeated the home team 46-34. The Techawks kept the visitors in check fairly well during the first half, which ended 21-19, but Beloit added to their lead in the second period, and had little difficulty in winning.

The annual Chicago game was good as usual, and the Maroons had to put forth their best efforts to obtain the 33-28 score. O'Brien and Fitzgerald shared scoring honors, with 14 points each. O'Brien got most of these towards the end of the first half, when Armour went on a scoring spree. Chicago clinched the game in the last minute of play by dropping a field goal and a free throw.

In the return game with Lake Forest, the Techawks easily beat them 37-26. The return of O'Connell, who had been ineligible for the last four games, helped considerably. O'Brien and Henriksen led the scoring with 13 and 11 points, respectively.

The Tech squad journeyed to Beloit for the return game on Jan. 7. The game started slowly with see-saw play, the score standing 13-9 in favor of A. I. T. at the half. Armour clicked in the second half, however, and won easily 30-19.

Our wandering basketeers next paid their respects to the Western Illinois State Teachers, at Macomb, Ill. This game was characterized by its roughness and poor officiating. O'Connell went out on fouls in the first half, Merz early in the second half, and Heike and Wagner in the last two minutes. Macomb led at the half 19-16, after Armour had pulled the tally up from 16-3. The second half saw a lot of fast and scrappy ball, with the Leathernecks ending up on top 35-28.

Returning to the Armory, the visiting Wheaton team was defeated 39-30. The first half was very slow, with no scoring for the first five minutes of play. Then Wheaton broke the ice with a field goal, and proceeded slowly. In the last five minutes of the half, the Techawks forged ahead to end it 20-14. In the second period, Armour had no trouble in keeping ahead and went to the showers with the score at 39-30.

Michigan State Normal was the next victim of the Tech five, when, on Jan. 22, they were defeated 31-22. A good defensive game was played by both teams in the first period, which ended in Armour's favor 10-7. Armour opened their offensive attack in the second half, and as the score mounted, Ypsilanti rallied to bring it to 21-19; but the Techawks checked them in time, and won 31-22.

After the final exams the team started on its annual Michigan trip, playing the first game at Ypsilanti, on Feb. 4. This game was practically a duplicate of the first game, the playing being of the same style. The Tech five left with a 38-33 victory.

The second game of the Michigan trip, with Detroit U, saw the Armour squad completely outclassed by a superior Detroit five. Captain Heike, who was forced to return to Chicago because of the flu, was missed greatly. He was unable to play for the rest of the season.

On Feb. 9, North Central defeated Armour by the closest score of the season, 34-33. The lead went from one team to the other throughout the entire game. In the last 10 seconds, with the score 34-32, Armour sank a free throw from a technical foul, but could not get the ball to make the winning basket.

Macomb lost their return game here 39-30. This game, like the one at Macomb, was very rough, a total of 37 fouls being called. The scoring was very close during the first half, but Armour pulled ahead in the second, to win without much difficulty.

The Techawks traveled to Naperville on Feb. 20 for the final game of the season, losing to North Central 51-21. The "Red Demons" went completely wild, making long shots from every point on the floor. The weary Tech squad, who had played a hard game with Macomb the night before, could not hold them in check.

BOXING

Armour's boxing season was begun this year with a school tournament. Tony Allegreti won the 133 lb. class, Ray Bacci the 147 lb. class, and Palonis the heavyweight title. Tournaments of this type provide excellent opportunities for uncovering talent for the school teams.

In their first regular meet of the year, on January 15, the Tech sluggers defeated the University of Chicago settlement team, winning all six bouts. Stober and Allegreti won bouts with technical knockouts, and Simeon, Calhoun, Moore, and Winslow received decisions over their opponents.

This year was the second that Coach "Sonny" Weissman has entered a team in the Golden Gloves tournament. Of the ten man team entered, only two battled to the finals. These were Captain Moore and Neal Simeon. Moore, in his first night's fighting, knocked out both of his opponents, and on the second night stopped his man in the second round. Simeon successfully vanquished his foes in the preliminary bouts and in the second night's fighting stopped his opponent in the first round. Both were forced to forfeit their final bouts, however, because Moore had a bad eye and Simeon had to participate in an Armour track meet.

SWIMMING

The Interclass and Interfraternity swim meet initiated the swimming season at Armour this year. In the Interfraternity affair Phi Kappa Sigma

REVIEW

walked, or should we say swam, away with the meet. They took first in every event, three seconds, and one third, to pile up a score of 48 points. Phi Pi Phi was second with 10 points and Rho Delta Rho and Pi Kappa Phi brought up the rear with 8 and 4 points, respectively.

The sophomores won the interclass meet, winning both events for which they received 13 points. The seniors and freshmen tied for second place with six points apiece.

The swimming team won their first meet of the season, defeating North Central 44-31. Havlicek was high point man with 10 points. Groves and Carlson tied for second with 8 points apiece. As for the events won, Carlson took the 40 yard dash, Svagdis the 100 yard breast, and Havlicek the 100 yard and 220 yard. Carlson also took second in the fancy diving.

The Purdue Boilermakers handed the Tech swimmers their first defeat of the season, drowning them with a 53-22 score. Svagdis saved the day for Armour by winning the 100 yard breast stroke in 1:15.8 and picking up a four yard margin in the medley relay, which Winblad, the anchor man, managed to retain. Winblad took a third in the forty yard free, and Dodge a second in the 100 yard back.

The swimmers were defeated in their next meet 45-30 by George Williams college. However, in the Armour victories, Svagdis won the breast stroke as usual, Dodge the 100 yard back stroke, Winblad took a second in the 40 yard free style; and the 120 yard Armour medley team, composed of Downing, Svagdis, and Winblad, easily won this event.

TRACK

The Juniors maintained their supremacy on the track this year by winning the interclass track meet for the third consecutive time. They captured all the places in the 60 yard dash, and low hurdles, and took a first in the high jump as well as places in a number of the other events. The Sophomores were second in the meet, sweeping the mile event and making a good showing in the rest of the races. The final score was Juniors 52 — Sophomores 49.

The opening track meet of the season saw a superior North Central squad defeat Armour 67-28. Simeon obtained the only first for Armour, winning the high jump with a leap of 5 ft., 8 in. Vanderkieft took seconds in the high jump and shot put. Some of the high spots of the meet were Siebert's winning pole vault of 13 ft., 6 in. and Teichman's snappy 4:51.3 mile.

WRESTLING

The wrestling team is now in the midst of one of its most successful seasons. Coach Weissman is to be congratulated upon its excellent showing. The boys won their first meet of the season by trouncing De Kalb, taking five out of the eight matches. Captain Kreml did the best job of the day, pinning his man in 2:09. McIntyre ran up against some stiff competition and was pinned in 57 seconds. McDaniel, Jaffee, and Maxant won on time advantages, and Dunne won his match in an overtime period. Basil and Tullgren were on the bottom long enough to give their opponents the necessary time advantage, and lost their matches.

In the next meet Armour beat Wheaton, the little nineteen champs, by a score of 20½-11½. Dunne, Kreml, and McIntyre won the most spectacular of the eight matches, with the rest of the team giving a good enough battle to bring up the score.

North Central was swamped by the score of 29-3 in the next meet; McDaniel and Basile pinned their men, and Dunne, Logullo, and Popper won by time advantages. Capt. Kreml won by a forfeit. McIntyre lost his match, his opponent having a time advantage of 1:12.

The Tech matmen suffered their first defeat of the season when they lost to Illinois State Normal 22-10. Dunne and Kreml were the only Armour men to win their matches, both of them pinning their opponent.

In their meet with Morton Junior College, Armour was victorious 29-5. McDaniel won by a forfeit. Basile, Logullo, and Popper won by time advantages, Kreml pinned Kanak, and Tullgren and McIntyre pinned their opponents in 53 and 35 seconds, respectively.

In their second meet with North Central, Armour's wrestlers shut them out completely 30-0, winning all of the eight matches. McDaniel, Logullo, and Tullgren pinned their opponents, the others winning by riding their men long enough to gain the time advantages.

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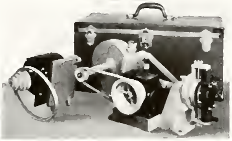

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Write for Bulletin No. 2448

ILLINOIS TESTING LABORATORIES, Inc.

146 W. HUBBARO ST. CHICAGO, ILLINOIS

BRIDGE

(From page 9)

carried by twelve wire-ropes one and nine-sixteenths inches in diameter and spaced eighteen inches apart. These wire-ropes between towers were erected by fastening one end at the base of one tower and then laying the rope along the bottom of the gate to the other tower. It was then hoisted into position and fastened at the tower-tops. Adjustment was provided in the attachment of the ropes so they could be lengthened or shortened as required to suit the sag of the cables which of course varied as the weight of the suspended structure was applied. The wood floor of the catwalks was painted with fire resistant paint so as to minimize the danger of fire. At intervals of one hundred feet a twelve-foot section was applied to a steel frame so that it could be quickly removed to form a fire stop.

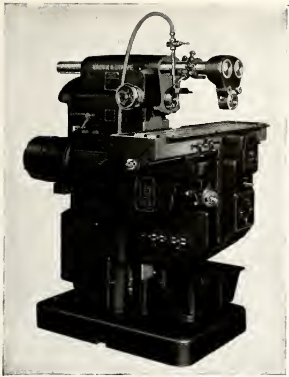
Essentially the "spinning" of the cables consists of taking bights of cable wire from the reels at one anchorage and pulling them across to the opposite anchorage where they are looped over a shoe which in turn is fastened to the anchorage. Each shoe (called "strand-shoe") is capable of holding all the wires that go to make up one strand.

The sixty-one strands that make a cable average four hundred fifty-two wires each. The spinning wheel assemblies which shuttled back and forth consisted of four sheaves, three of which always carried a bight of wire; thus six wires were laid at each passage. The spinning wheels were attached to endless hauling ropes by means of which they were pulled along their course at the rate of over six hundred feet per minute. Four such spinning units were always in operation simultaneously spinning on four strands at one time. Many days saw a thousand miles of wire placed in eight hours of working time. The four strands during spinning were supported in temporary position above and a little to one side of the cable. As each set of four strands was completed, it was lifted from its spinning position and placed in its final position in the cable; pinned in place at the anchorages and then adjusted accurately to length by taking-up or letting-out at the strand shoe where special means for adjustment were provided.

When all strands were completed the cables were compacted by means of a machine which encircled the cable and by hydraulic pressure of forty-five hundred pounds per square inch squeezed the cable into a circular cross-section thirty-six and one-half inches in diameter. Under this pressure narrow steel bands were applied about three feet apart to bind the cable together until the wrapping could be applied. Finally the cable is closely wrapped with steel wire which holds it compact, and protects it against both mechanical injury and the weather.

Erection of the Steel

During the year required for construction of the cables, the steel work for the suspended structure or bridge floor was fabricated and delivered. This steel work was erected by means of traveling derricks, two of which started from each tower, one working toward the shore and the other toward mid-span. These travelers simply attached the steel to the suspenders which hang from the cables at fifty feet intervals. They thus proceeded, laying their own track ahead of themselves. The two main span travelers met at mid-span, and then each started back toward the towers setting the handrailing, curbs, and the remainder of the floor members, leaving behind them a completed steel structure ready to receive the paving. Meantime, the other two travelers from the shore ends also worked back to the towers, completing erection of the side spans. With the addition of the concrete



No. 10

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- The old *S-s-s-t* method of temperature determination is inadequate for modern processes. Paper, Textile, Rubber, Plastics and a host of other industries need this quick, accurate and rugged means of reading the temperatures of still and moving surfaces . . . the Cambridge Surface Pyrometer.

The hand model is shown. Another model is provided with an extension for the hard-to-get-at places. Plastics use the mold type.

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and other Mechanical and Electrical Instruments

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3732 Grand Central Terminal, New York City

pavement the structure would be ready for traffic.

The Safety Net

The Engineers on the Golden Gate Bridge were especially concerned about the safety of workmen on the job. According to all precedent, it was feared that from six to twelve men would be killed in the erection of the structure. The very thought that the execution of work called for by your plans may involve such a toll of lives gives you a mighty uncomfortable feeling. Any conceivable safeguard which would reduce the hazard must be earnestly considered. Many simple, helpful measures were taken, and the result of these ordinary precautions is reflected in the low accident record. After a careful study the Engineers decided upon a safety measure that had never been applied on any other job. They concluded that as the suspended structure was built out from the towers, huge nets should be stretched across beneath and suspended from this steel work. It would be possible so to devise this that even the workmen at the extreme forward part of the work would be protected by a net carried on a framework cantilevered out ahead of the traveler. The net would extend for the full width of the bridge and ten feet beyond on each side. Upon completion of the floor erection there would be suspended from it a continuous net one hundred ten feet wide and sixty-five hundred feet long which, like a safety net in a circus, would catch men who lost their footing and save them from a drop of two hundred fifty feet into the sea and certain death. The cost of this net, its erection and subsequent removal would be about $130,000.00. The Engineers said this was not too much to pay for the lives of the men who would be saved. They asked the Bridge District to contribute $82,000.00 and the contractor the balance. The District immediately appropriated its share, and then the contractor agreed to go along. Likewise the California State Industrial Accident Commission was won over to this novel safety scheme. The Engineers now have the satisfaction of knowing that their insistence on the adoption of this safety net has resulted in saving the lives of eleven men up to the time when this was written.

In five consecutive working days six men were caught by the net. They came up smiling and went right back to work. Ask these men and their families whether or not this $130,000.00 has been well spent.

Materials Required

It will be of interest to note the quantities of principal materials required for the main structure only. They are as follows:

Concrete	300,000 cu. yds.
Structural Steel	75,000 tons
Cable Steel and Suspenders	25,000 tons
Paint	50,000 gallons
Cement	450,000 barrels

The bridge will be completed on May 1, 1937, and will be opened to the public on May 20.

I shall adopt NEW VIEWS as far as they appear to be TRUE VIEWS.
—Lincoln.

TELETYPESETTER

(From page 23)

characteristics of the standard keyboard, and adds mounting facilities and connections required for automatic operation. The operating unit proper is readily removable for cleaning and adjustment. Like the perforator, it is entirely mechanical. Power for its operation is obtained by means of a belt drive from the intermediate shaft on the linecasting machine.

All of the linecasting machine keyboard key levers extend to the front of the keyboard beneath the lower row of keys, and engage the selecting mechanism of the operating unit which is mounted beneath the keyboard base casting. That portion of the unit extending to the right of the keyboard carries two clutch operated shafts, one to control selection of the keys, and a second to deliver the line to the casting mechanism.

As shown in Figure 4, the tape is fed through the sensing mechanism at the right end of the operating unit. There the combinations are sensed by feelers adapted to control the setting of six code bars and a shift code bar, which extend beneath the keyboard and are notched to respond to the selection code in a manner identical with the notching on the code bars of telegraph printers. For each setting of the code bars, one of the character key levers or the space key lever is operated until the elevator signal is received. This signal selects a special mechanism which disengages the selector clutch, and engages the elevator clutch, thereby stopping the tape, and causing the assembling elevator to rise to its upper position where the assembled line of matrices and space bands is delivered to the casting mechanism. When the assembling elevator returns to its normal position, the selector clutch is again engaged and selection of key levers is resumed.

In common with all complex machinery, the linecasting machine is subject to occasional troubles. To prevent damage to the machine or to the matrices when such troubles occur, the operating unit is equipped with a number of safety devices. For example, if the assembling elevator is prevented from rising, the motion of the elevator cam is absorbed in a yielding connection, and if the linecasting machine is not ready to accept a completed line of matrices, the elevator clutch is not engaged until the machine does become ready. During all such interruptions and abnormal conditions, the tape automatically stops, and in the case of serious trouble remains stopped until the trouble has been cleared by an attendant.

Commercial Teletypesetter apparatus is now used in the United States and Europe in a variety of applications which illustrate the flexibility of the system. For example, a newspaper located in Edinburgh, Scotland, prepares a large column of tape on perforators in its London office, and reproduces this tape in its Edinburgh plant by means of printing telegraph circuits and apparatus. While the tape is being reproduced in Edinburgh by a reperforator, Teletype printers controlled by the same signals prepare a typewritten copy of the material contained in the tape. The tape is then used to control a battery of linecasting machines equipped with Teletypesetter operating units, and the printer copy is used by the editors in the usual manner. The matter being set consists of the British stock market and also a considerable portion of the news matter originating in London. Because of the many extra characters and fractions required by the British stock market report, the Teletypesetter equipment used by this installation was developed especially for this purpose. Accordingly, it is somewhat more complicated than the standard equipment described in the fore part of this article.

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Another interesting application is located in the Eastern part of the United States. There one publishing company prints two newspapers, one in each of two cities located on opposite sides of the Hudson river, but composes all of the type in one composing room located in the larger city. The news matter originating in the smaller city across the river, where a typewritten copy is made by a telegraph printer, and the tape is simultaneously reproduced by a telegraph reperforator. In addition, all of the text matter, including classified ads and editorials originating in the larger city, is prepared in tape form on a battery of perforators. This locally prepared tape and the tape which is telegraphed from the city across the river is used by a battery of linecasting machines equipped with standard Teletypesetter operating units. This battery of automatic linecasting machines prepares all of the text matter required by both newspapers.

In still another installation in the Mid-West, tape is prepared in a central location and is telegraphed to other printing plants, each equipped with a reperforator for reprodcing the tape, and a printer for providing typewritten copy for editorial purposes. Thus, a single preparation of tape is sufficient to provide type for a number of different locations.

In a Chicago plant the same type must often be set two or more times. In this case a single tape is prepared and is repeatedly fed through the linecasting machines until the type has been set the required number of times. This installation uses another feature of tape operation, since time copy such as serial stories and feature articles is often set in tape several weeks in advance of the time the type is required, and the tape is stored until needed.

In the case of the Edinburgh newspaper, the motive for using Teletypesetter was not primarily economy, but rather the increased speed with which the stock market could be set using the Teletypesetter method. However, in American installations economies made possible by higher production have been reported by users.

Although Teletypesetter is now restricted to the newspaper field, its advantages may eventually be extended to the job printing field. However, it is only in the newspaper field that great volumes of type are set daily in the same style of type and the same column measure, and accordingly it is expected that Teletypesetter will find its greatest immediate utility in this field.

ALUMNI NEWS

by D. P. Moreton, Sec'y-Treas

Alumni Banquet

DATE: Tuesday, May 25, 1937.

PLACE: Medinah Club of Chicago, 505 N. Michigan Blvd.

TIME: 6:30 P. M.

◆ ◆ ◆

Meet your old friends and the new members of the Faculty and the Research Foundation.

Enjoy a good dinner, and music by the Armour musical organizations under the direction of A. Gordon Erickson.

Hear about the new developments at Armour Tech, and Help give the boys of '37 a real welcome.

◆ ◆ ◆

We are counting on your being there.

Call D. P. Moreton, Sec'y.-Treas., Armour Alumni Association, VICtory 4600, for your reservation.

$2.00 per plate. No tips.

Further details in the May issue.

Alumni Banquet

The Annual Spring Banquet of the Alumni Association will be held at the Medinah Club of Chicago, 505 N. Michigan Boulevard, on Tuesday evening, May 25th. An excellent program is being arranged, the particulars of which will be announced in the May issue.

We are making out a card for every graduate, giving all the information now in our files. These cards will be distributed shortly to each class captain or group who will in turn distribute them to smaller groups in order that every man may be reached. In this way the information can be checked, the alumnus informed about the banquet, and a real class representation organized. Your help in this matter will be appreciated. May we hear from you by phone, letter, or personal call.

Calling All Armour Tech Men

There has been a very good response to our request that you fill out and mail the return post card enclosed in the last issues of the *Armour Engineer and Alumnus*. But, unfortunately, the information on our file cards is still far from complete. A number of you have returned the cards only partially filled out, and many have not returned the card at all.

The cooperation of every Armour Tech man is required; and you are urged to send in correct information regarding the following:

(1) Full name, department, and year.

(2) Home address and telephone.

(3) Business address and telephone.

(4) Your position and title.

(5) Personal news items.

The fact that you are receiving the *Armour Engineer and Alumnus* is no guarantee that we have all the information asked for above; so please give us your help. The correctness of the information which the Alumni Directory will contain when published depends upon your response to this request.

* * *

Naughty Seven to Frolic

This year marks the 30th Anniversary of the graduation of the class of 1907, and a committee is already busy with plans for a gala celebration. Members of the class, whether they finished their course at Armour or not, are being urged to attend the events that are to start on Saturday, May 22, and continue until Tuesday, May 25, closing with the Alumni Banquet that evening. The program includes luncheons, "get-together" sessions, a golf day, attendance at a big league baseball game, and an all-day outing at Al Eustice's "Gentleman's Farm" near Barrington, on Sunday, the 23rd.

Every '07 man in the country is being contacted and urged to come to Chicago and share in the good fellowship, frivolity, and rehearsal of the good old times of 1903-07. Wives and sweethearts are to be included in all events. Out-of-town folks are especially urged to be on hand, at least over Saturday and Sunday, if they cannot remain for the later events.

In 1932 the Class of 1907 held a 3-day reunion that will live long in the memories of all who participated. The 30th Reunion will outshine it and be a high spot in the lives of every one of the '07 stalwarts.

The Committee on Arrangements includes Alfred Eustice, W. F. Hebard, Rudolph Morrison, Blake Hooper, Benj. Perlstein, John Ehretsman, James Matchett, and Fred Heuchling.

All those who attended college with the class, whether they graduated or not, are urged to get in touch with the Committee *now*—addressing them at 1310 Glenlake Avenue, Chicago. Let's go!!

* * *

News Items

Do you like the news items about the members of the various classes? Have you any suggestions, and, if so, will you please let us hear from you? These columns can be made more interesting if each of you will supply us with information regarding yourself. Will you not do so now on the return post card or by letter? We thank you.

Class Reunions

This year is the fortieth reunion of the class of 1897, the first to graduate from Armour. They will hold a reunion on the evening of the Alumni Banquet, Tuesday, May 25th, at the Medinah Club. The boys of '97 have set a fine example for all of us who follow—and we salute them. We are hoping to see a large number of them at the banquet.

All the other classes whose years are multiples of five will hold special reunions at the same time. The 1907, 1917, 1927, and 1932 classes have already displayed an active interest. The Alumni office will be glad to assist in supplying lists, addresses, etc.

* * *

Alumni Groups

We have requested the various groups to report on their activities for the year and hope to have something interesting in the May issue. Will all groups please take notice of this fact and let me hear from their president or secretary?

* * *

Employment

The improvement in business has brought about a greater demand for Armour Tech men, and we want to help them get located in a position where they can be of greatest service to industry and where at the same time they can definitely better themselves. We suggest that you write us in detail stating experience, salary, and the kind of change you would like to make, etc. You may be assured that we will give the case our personal attention. Address your letter to Prof. D. P. Moreton, Alumni Secretary, 3300 Federal St., Chicago.

* * *

Movie Film

Some thought is being given to the idea of providing a movie film of interesting events at the school: professors in action, new laboratories, etc., which might be sent about the country and used by groups of Armour men. We should appreciate some indication of your interest in this means of bringing you back to Armour Tech for a visit. Will you please send us your candid opinion, and would you be interested in the use of the film yourself? A small charge would be made to cover transportation.

* * *

Visit Armour Tech

We appreciate the visits made by Armour men, and as we grow old together our friendships mean more to us. Why not pay us a call and talk over old times and plan for the future? You will be welcome at any time.

* * *

Lost Armour Men

Since publishing the lists of missing men in the December issue of the *Engineer* we have located over one hundred and added only a few others. We surely appreciate your cooperation and hope you will continue to help us so that we may eventually know where every Armour man is located. Will you please continue to check over your own class, also those before and after, and let us hear from their president fraternity brother, friend, company, etc., to whom we may write for information.

LIFE MEMBERS

ABELL, H. C.	E.E. '97
ALSCHULER, A. S.	ARCH. '99
BABCOCK, F. R.	E.E. '03
BADGER, H. R.	E.E. '07
BAER, W. J.	E.E. '10
BEAR, W. P.	Ex E.E. '05
BANNING, T. A., JR.	E.E. '07
de BEERS, F. M.	CH.E. '05
*BENTLEY, W. J.	CH.E. '20
BREMER, H. A.	Ex E.E. '06
BRUBAKER, W. C.	M.E. '06
BUNGE, L. W. A.	M.E. '15
BURLEY, E. R.	M.E. '13
CARR, B. S.	IND. ARTS '15
*CLAUSEN, H. W.	C.E. '04
CROWN, V. M.	C.E. '18
DEAN, W. T.	E.E. '00
DANIELS, M. F.	F.P.E. '11
DIERKING, F. C.	C.E. '12
DUERINCK, P. J. J.	E.E. '23
DURR, H. A.	M.E. '05
ERICKSON, O. R.	C.E. '11
EUSTICE, A. L.	E.E. '07
FARNSWORTH, J. E.	E.E. '26
FISCHEL, R. E.	E.E. '13
FRARY, D. R.	E.E. '04
FREEMAN, E. H.	E.E. '02
FREUNDT, G. L.	E.E. '29
GEYMER, H. H.	E.E. '26
GILLETTE, E. F.	ARCH. '06
GOPPELSROEDER, R.	F.P.E. '16
GRANT, R. G.	E.E. '08
GRIFFENHAGEN, E. O.	C.E. '06
GRIFFENHAGEN, P. F.	C.E. '13
HAGGANDER, C. A.	C.E. '07
HAMMOND, C.	ARCH. '04
HARRIS, R. B.	M.E. '02
HEIN, P. L.	C.E. '05
HEINE, F. C. B.	E.E. '05
HEITNER, W. A.	M.E. '21
HENDERSON, R. M.	E.E. '02
HEUCHLING, F. G.	CH.E. '07
HILLER, E. J.	E.E. '04
HILLER, E. F.	C.E. '06
HILLS, C. W., JR.	E.E. '11
HOLCOMB, C. S.	C.E. '06
HUEY, R. S.	E.E. '99
JAMES, G. B.	CH.E. '11
JAMES, S. V.	M.E. '07
JARVIS, B. H.	M.E. '13
JOHNSON, C. O.	C.E. '06
KENRICK, R. S.	E.E. '22
KOCH, R. J.	C.E. '13
LANG, W. H.	M.E. '02
LAUTZ, W. H., JR.	ARCH. '13
LEININGER, W. G.	C.E. '06
LEWIS, E.	E.E. '02
LEWIS, W. I.	M.E. '01
LIEBERMAN, E.	C.E. '06
LINDBERG, F. A.	E.E. '01
LOEWENBERG, M. L.	C.E. '12
LUNDGREN, L.	C.E. '04
McMULLEN, E. W.	CH.E. '09
*MONIN, D. L. C.	Dean A.I.T.
MORETON, D. P.	E.E. '06
MORGAN, C. W.	M.E. '08
MOSS, C. M.	E.E. '02
MOYSES, H. E.	E.E. '10
NELSON, A. W	Ex E.E. '11
OBERFELDER, W.	F.P.E. '06
PACKER, C. S.	C.E. '08
PARSONS, H. N.	M.E. '11
PATTEN, G. H.	E.E. '98
PAVEY, W. B.	M.E. '99
PENN, J. C.	C.E. '05
PERRY, R. V.	M.E. '97
RAYMOND, H. M.	Past Pres.
REID, J. S., JR.	E.E. '11
*REYNOLDS, M. B.	C.E. '06
ROESCH, D.	M.E. '04
RUEGNITZ, W. R.	E.E. '01
SANFORD, L. A.	E.E. '02
SCHOMMER, J. J.	CH.E. '12
SCHROEDER, C. P.	E.E. '99
SHAKMAN, J. G.	CH.E. '14
*SHIMIZU, H. S.	M.E. '03
SIECK, H.	CH.E. '11
*SPITZGLASS, J. M.	M.E. '09
STONE, J. M.	M.E. '20
STRONG, A. P.	E.E. '09
STRUBE, H. L.	M.E. '06
TAUSSIG, W. S.	E.E. '03
WAGNER, A.	E.E. '03
WALBRIDGE, J. T.	C.E. '07
WALLACE, E. L.	E.E. '02
WHITAKER, D. A.	E.E. '12
WHITE, E. C.	M.E. '99
WILSON, F. N.	M.E. '06
WISHNICK, R. I.	CH.E. '14
WOLDENBERG, M.	CH.E. '06

---

* Deceased.

ALUMNI NOTES

1897

F. E. MOSKOVICS, Academy, is chairman of the Executive Committee of the Dictograph Products Co., Inc., manufacturers of interior telephone systems, nurses signal phones, acousticon hearing aids, aircraft radio communication equipment, etc. The main office is at 580 5th Ave., N. Y., and branch offices in at least twenty of the leading cities throughout the U. S. Mr. Moskovics resides at 1 Fifth Ave., N. Y. Modesty on the part of Mr. Moskovics prevents our mentioning his many accomplishments in the business world, but Armour Tech is glad to hear about the success of her sons and best wishes for their success and happiness follow them throughout their lives.

HARRY CLINTON ABELL, M. E., resides at Mandeville, La. He has retired and is spending his time looking after personal matters.

NEIL M. LONEY, M. E., is with the Fisher Body Corp., with offices in the Gen-

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eral Motors Bldg., Detroit, Mich. He resides at 8343 Hendrie, Huntington Woods, Royal Oak, Mich.

MISSING:
Salamson, Max, E. E.

DECEASED:
Chapman, P. R., E. E.
Church, Edw. S., E. E.
Freeman, C. E., E. E.
Gaylord, T. P., E. E.
Malcomson, C. T., E. E.
Matt, G. L., E. E.
O'Brien, E. D., E. E.
Richardson, E., E. E.

1898

FRANK S. DUNHAM, ex-chemical, paid the alumni office a visit a few weeks ago. He did not finish his engineering course at Armour Tech, but left after about two years to take up some special work at the University of Chicago. Mr. Dunham has been engaged in engineering work since finishing school, and for many years has been with the Permutit Co., in the Chicago office, 210 S. Clark St. He resides at 6911 Bennett Ave., Chicago.

A recent communication from RICHARD H. GRAY, E. E., brings the information that he resides at 1314 Oak St., N. W., Washington, D. C., and has the position of Associate Engineer in the Office Architect, U. S. Capitol, Washington, D. C.

EDWIN G. HINDERT, E. E., resides at 922 N. Grove Ave., Oak Park, Ill. His return card states that he is now retired from the Public Service Co.

MISSING:
Weinsheimer, W. E., E.E.

DECEASED:
Blodgett, E. E., E. E.
Fairman, F. S., Arch.
Flanders, L. H., M. E.

1899

WILLIAM HENRY BEATTYS, JR., E. E., resides at 212 N. Lincoln St., Hinsdale, Ill. He is Chicago representative of the Westinghouse Air Brake Co., with offices at 827 Railway Exchange Bldg., Chicago.

BENEDICT SHUBART, M. E., is senior partner of the firm, Shubart and Schloss, organized in 1903, and engaged in engineering sales. Their offices are at 521 Boston Bldg., Denver, Colo. Mr. Shubart resides at 2241 Clermont St., Denver, Colo. He states on his reply card—*"It has been an interesting and exciting life, with many adventures, certainly not humdrum."*

LOUIS ELLIOTT, E. E., is consulting mechanical engineering in care of Ebasco Services, Inc., Rm. 1530, 2 Rector St., New York, N. Y.

We recently located E. CANTELE WHITE, M. E., and are glad to report that he is president of the Ansonia Clock Co., with offices at 420 Lexington Ave., New York, N. Y., and that he resides at the corner of Palisade Ave. and 254th St., New York, N. Y.

We have just received the sad news of the death on February 19 of ELMER H. OLSON, E. E. On February 12 he was taken to the hospital with pneumonia, which developed from a cold contracted ten days previously. Mr. Olson had been connected with the Atchison, Topeka and Kansas City R. R. for over thirty years.

MISSING:
Matthews, W. D., E. E.
Morse, C. S., E. E.
de Rimanoczy, B., E.E.

DECEASED:
Bippus, S. E., E. E.
Goodhue, A. H., M. E.
Hanai, Geo. K., E. E.
Johnson, E. C., E. E.
Lewis, Chas. T., M. E.
Marienthal, O. B., Arch.
Olson, E. H., E. E.
Powers, H. S., Arch.
Terry, O. N., M. E.
Warren, Wm., E. E.

1900

GEORGE FOWLER HAYDEN, E. E., is secretary of the Continental Insurance Co., 80 Maiden Lane, New York, N. Y., and he resides at 25 Trinity Place, Montclair, N. J.

VERNON S. WATSON, Arch., resides at 643 Fair Oaks Ave., Oak Park, Ill., but he informs us that he spends about seven months of the year at Barrien Springs, Mich., and may be addressed R. R. No. 2. In a recent communication mailed from

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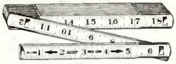

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Barrien Springs, Watson informs us that he expects some day to have an arboretum of note and that he is now well on the way. He also states that he is still practicing architecture and at present building a library for the local college.

MISSING:
Campbell, Mrs. M., C.E.
Graff, H. W., E. E.
Martin, Robt. C., E. E.

DECEASED:
Bradley, L. C., M. E.
Creelman, A. T., E. E.

1901

ALDEN C. NOBLE, E. E., resides on Garth Road, Scarsdale, N. Y., and he is with the Merchants Fire Assurance Corp. of N. Y. at 45 John St., New York, N. Y.

CHARLES A. V. AXEN, M. E., 2320 Rowley Ave., Madison, Wis., is master mechanic for the Chicago and Northwestern R. R., Madison, Wis.

CHARLES W. PIERCE, Ch. E., 4847 Champlain Ave., Chicago, is teaching science and math at Du Sable High School, 4924 Wabash Ave., Chicago.

JOHN B. SWIFT, E. E., owns and operates his own sales business, 205 W. Wacker Dr., Chicago, and resides at 4109 Kenmore Ave., Chicago.

MISSING:
Arnold, M. H., E. E.
Baker, E. H., M. E.

DECEASED:
Bernhard, F. H., E. E.
Miller, W. E., E. E.
Parker, John H., E. E.

1902

WALTER THOMAS CHARLES, Ch. E., resides at 57 E. Elm St., Chicago, and is practicing architecture with his offices at 77 W. Washington St., Chicago.

CHARLES MacLEAN MOSS, E. E., resides at 17829 Lakeroad, Cleveland, Ohio, and he is with the Westinghouse Electric and Mfg. Co., 207 W. 3rd St., Cincinnati, Ohio.

ROBERT GEORGE REINIGER, M. E., is secretary-treasurer of the Globe Electric Co., 307 1st Ave., S. Seattle, Wash., and his residence address is 1713 35th Ave., Seattle, Wash.

LOUIS A. SANFORD, E. E., resides at 6922 Yale Ave., Chicago, and has been very helpful in promoting alumni activities during the last few years.

A recent communication from Mrs. W. O. Collins brings the sad word that our fellow alumnus, WARD OLIVE COLLINS, E. E., passed away very suddenly on April 8, 1936. We take this opportunity of extending to Mrs. Collins our deepest sympathy.

MISSING:
Baird, M. F., E. E.
Benham, A. E., Arch.
Harwood, Ed. T., E. E.
Miller, Ivan D., C. E.
Scheidler, O., M. E.
Wallace, E. L., E. E.

DECEASED:
Anderson, A. H., M. E.
Collins, W. O., E. E.
Week, John E., E. E.

1903

WILLIAM CHARLES MATTHEWS, M. E., resides at 544 Sheridan Road, Evanston, Ill., and he is proprietor of the Matthews Gas Machine Co., 192 N. Clark St., Chicago, Ill.

EMIL FERDINAND NELSON, E. E., is with the Carnegie Illinois Steel Corp., at Wilkensburg, Pa., and his home address is 218 Biddle Ave., Wilkensburg, Pa.

JOHN FRANKLIN STRICKLER, M. E., resides at 105 Rhode Island Ave., Highland Park, Mich. He is secretary of the John Jam Handy Picture Service, Inc., 2900 E. Grand Blvd., Detroit, Mich.

SAMUEL JOHN WILLIAM WENDT, E. E., is electric operating manager of the Suffolk County, Los Island Lighting Co., 5 S. Bay Shore Ave., Bay Shore, N. Y., and he resides at 11 Lawrence Lane, Bay Shore, N. Y.

FREDERIC S. WILHOIT, E. E., is purchasing agent for Cutler-Hammer, Inc., 12th St. and St. Paul Ave., Milwaukee, Wis. His home address is 5907 W. Washington Blvd., Milwaukee, Wis.

A card from WINCHESTER W. FELT, Ch. E., states that he has not been able to work for five years. Mr. Felt filled the position of chemist for the General Chemical Co., Chicago Heights, Ill., for a period of twenty-five years. We are very sorry to hear of his illness and our wish is that he will regain his health. Mr. Felt resides at 1340 Schilling Ave., Chicago Heights, Ill.

MISSING:
Brimson, C. T., C. E.
Kaempfer, A., E. E.
Quien, E. L., Ch. E.
Stillson, H. G., E. E.
Weisskopf, M. J., C. E.

DECEASED:
Battey, F. V., E. E.
Edgecomb, E. E., M. E.
Kabateck, M. G., E. E.
Phillips, W. C. P., C.E.
Roos, E. S., E. E.
Shimizu, H., M. E.

1904

GEORGE WILLIAM BORST, E. E., resides at 660 N. Eagle St., Naperville, Ill. He is a member of the insurance and real estate firm, Scott, Langan, Borst & Lambe, Inc., 124 S. Washington St., Naperville, Ill.

FRANK ALBERT COY, C. E., who was among the missing alumni in the Dec. '36 issue, resides at 709 S. Second St., Springfield, Ill. and he is in the Bridge Design Section, Division of Highways, State of Illinois, Room 10, Centennial Bldg., Springfield, Ill.

CHARLES CLARKE SAMPSON, M. E., is maintenance engineer at the Glen Lake Sanatorium, Oak Terrace, Minn., and his residence address is Oak Terrace, Minn. Sampson informs us that his son, Charles M. Sampson, graduated in Mining Engineering from the University of Minn., in May, 1936, and that he is now geologist with the Freeport Sulphur Co., Freeport, Texas.

PIERRE V. C. SEE, E. E., is vice-president and general manager of the Akron Transportation Co., 47 N. Main St., Akron, Ohio. He resides at 389 Aqueduct St., Akron, Ohio.

MISSING:
Knapp, M. J., E. E.
Watt, J. M., M. E.
Clausen, H. W., C. E.
Hamilton, H. L., M. E.
Hart, Harry A., C. E.
Silver, E. I., C. E.

DECEASED:
Buie, Arthur, E. E.

1905

JOHN HOWARD PAYNE, E. E., resides at 3438 34th Place, Washington,

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BENJAMIN NATKIN, M. E., lives at 5211 Rockhill Rd., Kansas City, Mo., and he is president of Natkin & Co., 1800 Baltimore Ave., Kansas City, Mo.

SOLON L. REILY, Arch., is practicing architecture with his office at 300 W. Adams St., Chicago, and he resides at 707 Bluff St., Glencoe, Ill.

RHEA H. ROBINSON, E. E., is with the Ilg Electric Ventilating Co., 406 S. Main St., Los Angeles, Cal. He resides at 1115 S. Palmetto Ave., Ontario, Cal.

HERBERT MOORE SHARP, C. E., is president of the Maumee Asphalt Co., 1713 Second National Bank Bldg., Toledo, Ohio, and he resides at 1941 Potomac Drive, Toledo, Ohio.

OSCAR ALLEN ST. CLAIR, E. E., is professor and head of the department of Industrial Engineering and Engineering drawing at Texas Technological College, Lubbock, Texas. His home address is 1712 A-10th St., Lubbock, Texas. St. Clair spent twenty-five years in industry, most of which was with Beaver Products Co. and Atlantic Gypsum Co., before entering the teaching field. He has two sons, one with Marshall Field & Co., in N. Y. and the other a geologist with the Shell Petroleum Co., in Okla.

MISSING:
Ash, Howard J., E. E.
Beamer, B. E., E. E.
Brackett, John C., E.E.
Goldsmith, F. R., M. E.
Stem, Le Vere H., Ch.E.
Thompson, J. K., Ch. E.
Tyler, Alva W., E. E.
Wright, M. E., E. E.

DECEASED:
Armstrong, J. R., E. E.
Croskey, Philip, E. E.
Marshall, H. B., E. E.
McBurney, E. Jr., M.E.
Whitney, Fred B., C.E.

1906

WILLIAM C. BRUBAKER, M. E., is dean of the Pullman Free School of Manual Training, 250 E. 111th St., Chicago, and he resides at 2111 W. 109th St., Chicago.

WILLIAM RANDALL COLLINS, Ch. E., lives at 716 Brummel St., Evanston, Ill., and he is a salesman for the General Cable Corp., 20 N. Wacker Drive, Chicago.

EDWARD FRASER GILLETTE, Arch., resides at 691 LaLoma Rd., Pasadena, Cal. Recent word informs us that Gillette has retired. May we take this opportunity of wishing him the best of health and happiness.

CHARLES S. HOLCOMB, C. E., and AUGUST JETHER FRY, C. E., are both with the Board of Supervising Engineers, 231 S. LaSalle St., Chicago, under which the City of Chicago and the street railway companies are partners. Holcomb lives at 204 S. Lincoln St., Hinsdale, Ill., and Fry at 1324 W. Rosedale Ave., Chicago.

GROVER KEETH, M. E., is in charge of engineering for the Marathon Paper Mills Co., Rothschild, Wis. His home address is 1115 10th St., Wausau, Wis.

WALLACE McCRACKIN, E. E., is president of Ravalli County Bank, Hamilton, Montana. It seemed mighty good to hear from McCrackin and we hope the banking business in Montana is way up the road to recovery.

LOUIS A. PARADISE, M. E., is with the John Deere Harvester Works, East Moline, Ill., where he has been continuously since graduating. His home address is 1510 29th St., Moline, Ill.

LEE ROY ROSS, F. P. E., resides at 156 S. Main St., W. Hartford, Conn., and he is vice-president of the Phoenix Insurance Co., 30 Trinity St., Hartford, Conn. The writer had the pleasure of a short visit with Ross last spring and found him enjoying the best of health and the pleasure of a fine family.

GEORGE W. SMITH, E. E., is a consulting engineer with office at 1400 Allen Bldg., and his residence is at 3509 Lindenwood St., Dallas, Texas.

FRED NORWOOD WILSON, M. E., is no longer among the missing as we find he is living at Richmond, Ill., Route 21, Box 34. We are looking forward to the call he promised to make at the alumni office, and many thanks for best wishes to the 1906 boys.

MISSING:
Cook, Norman, Arch.
Cutler, Ed. W., E. E.
Edsen, N. L., M. E.
Gaylor, W. S., M. E.
Kukawski, Ed. S., Arch.
Morrison, R. D., M. E.
Scott, P. J., M. E.

DECEASED:
Carr, Alva L., M. E.
Dean, Stanley, C. E.
Meyer, E. D., E. E.
Reynolds, M. B., C. E.

1907

ALEXANDER H. BOEHMER, M. E., is with the Teletype Corp., 1400 Wrightwood Ave., Chicago. His home address is 520 Merrill Ave., Park Ridge, Ill.

GUSTAVE A. HAGGANDER, C. E., resides at 62 Malden Ave., LaGrange, Ill. He is bridge engineer for the B. & O. R. R., 547 W. Jackson Blvd., Chicago.

CHARLES S. HENNING, JR., E. E., is vice-president of the Womack-Henning Construction Co., Abilene, Texas. His home address is 2137 S. 8th St.

GEORGE S. LAUBACH, C. E., lives at Jadwin, Dent Co., Mo., and he is with the U. S. Forest Service and located at Berryman, Mo.

CHARLES J. NELSON, C. E., is in charge of city engineering and housing, Keokuk, Iowa. His office is in the City Hall, and he resides at 517 N. 6th St. Nelson reports a definite increase in the volume of building in better homes and business buildings.

ARTHUR D. QUACKENBUSH, E. E., is manager of the Mobile Division of the Alabama Power Co., Mobile, Ala.

JOHN LORENZ SCHMIDT, F. P. E., is president of Aquos Products Co., 1104 Burdsal Pkwy., Indianapolis, Ind. His home address is 1236 N. New Jersey St.

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SIDNEY CHARLES SINGER, M. E., is division manager, Northern Division, Southern California Gas Co., 124 N. Maryland, Glendale, Cal. He resides at 530 N. Central Ave.

ROBERT ADAMS WIGHT, Ch. E., is located in the industrial sales department of the Peoples Gas Light and Coke Co., Chicago, and he lives at 415 S. Monroe St., Hinsdale, Ill.

JOHN BARNARD WELLS, M. E., reports that he is secretary of Snook and Wells, Inc., producers of crude oil, also secretary of the Kern Sunset Oil Co., both at Maricopa, Cal., P. O. Box 848. Mr. Wells and his associate, M. J. C. Snook, who, by the way, is his brother-in-law, have introduced quite a number of novel ideas in the oil field which, he reports, are working out to their advantage. One of these ideas has to do with their pay schedule which amounts to paying their men in cents per hour the same as the company receives in cents per barrel with no top limit set. Monthly men have their salaries adjusted suitably to maintain the differential between these men and the others.

MISSING:
Badger, L. H., C. E.
Heinsen, Geo. M., C. E.
Kilgore, C. E., M. E.
Turnbull, Ira J., M. E.
Wendell, R. B., E. E.
Wolfe, Edw. J., E. E.
Young, L. B., C. E.

DECEASED:
Alling, C. R., F. P. E.
Campbell, E. E., E. E.
Davies, H. C., M. E.
Ellett, E. H. Jr., C. E.
Jackson, I. F., M. E.
Smalley, J. S., E. E.
Stanton, G., Jr., C. E.
Williams, W., E. E.

1908

DWIGHT ORION BARRETT, M. E., is mechanical engineer for the Gulf Oil Corp., First National Bank Bldg., Tulsa, Okla. He resides at 2107 N. Boston Place, Tulsa, Okla.

We were very sorry to hear that GEORGE CUMMINGS BURGE, M. E., passed away on Nov. 22, 1936. Mr. Burge had been in poor health for a number of years and resided at 1447 Bedford Rd., San Marino, Calif., since leaving Holabird and Root, Architects, Chicago, Ill.

EUGENE MARK BEATY, E. E., lives at 511 W. Lincoln St., Blair, Nebr., and he operates the Beaty Contracting Co., State Bank Bldg., Blair, Nebr.

MERTON JAMES DOUTHITT, C. E., is superintendent for Darrow and Barron, 222 N. Genesee St., Waukegan, Ill. He lives at 230 Gillett Ave., Waukegan.

MARTIN A. BUEHLER, E. E., is manager of the Graybar Electric Co., 413 S. 4th St., Minneapolis, Minn., and his residence is at 4360 Woodale Ave.

ROBERT F. SHERMAN, Ch. E., is chief chemist for the Corn Products and Refining Co., Pekin, Ill. His home address is Rural Route No. 1, Morton, Ill.

MAYNARD L. THOMPSON, Arch., resides at 612 W. 2nd St., Muscatine, Ia. He is a member of the firm, Thompson Bros. Co., Muscatine.

GROVER H. WILSEY, C. E., is chief engineer for the Foley Bros., Inc., 135 E. 42nd St., New York, N. Y. His residence is at 90 Harriman Ave., Hempstead, N. Y.

ADAM GEORGE WICKERHAM, Arch., is in business for himself at 135 E. 8th Ave., Homestead, Pa. He resides at 5872 Burchfield Ave., Pittsburgh, Pa.

ROY ALEXANDER WINSER, Ch. E., 1600 Hinemann Ave., Evanston, Ill., is in the chemical research dept., Armour Soap Works, 1355 W. 31st St., Chicago.

MISSING:
Caban, J., C. E.
Collins, F. C., E. E.
Cornwell, A. B., E. E.
Latta, Smith H., M. E.
Loofbourrow, J.D.,M.E.
Morey, C. R., E. E.
Zimmerman, S. L., C.E.
DECEASED:
Burge, G. C., M. E.

Dittmar, A. A., C. E.
Eyers, W., F. P. E.
Johnson, A. R., E. E.
Lunak, S. E., Ch. E.
Matthei, H. R., C. E.
Morgan, C. W., M. E.
Nichols, H. W., E. E.
Oehne, T. C. Jr., E. E.
Thomson, F. L., F.P.E.
Vacek, V. F., E. E.

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GURDON A. BINDER, E. E., lives at the Mira-Mar Hotel, 6218 Woodlawn Ave., Chicago. We understand Mr. Binder is slowing recovering from quite a serious accident.

NEWELL J. BOUGHTON, M. E., is engineer of tests for the M. K. T. Railway, 1520 Exchange Bldg., St. Louis, Mo. His home is at Parsons, Kans.

A. C. BUCKETT, Arch., is with the C., M., St. P. & P. Railway, Room 809, Union Station, Chicago, and he lives at 1010 Main St., Evanston, Ill.

EDWIN B. CRANE, E. E., is with Jensen, Bowen, and Farrell, Engrs., Michigan Theatre Bldg., Ann Arbor, Mich. Crane claims 915 Peerless Ave., Akron, Ohio, as his home, although a great deal of his time is spent in other cities in connection with the appraisal work which he is doing.

CONRAD A. ECKLUND, C. E., is a senior topographic engineer, United States Geological Survey, Washington, D. C. He resides at 1332 Loreto Dr., Glendale, Calif., and at present has a temporary business address at 700 Hall of Records, Los Angeles, Calif.

G. A. GRASSBY, JR., M. E., 207 E. Electric Ct., Sturgis, Mich., is president of the Zephyr Equipment Co., and director of research for the Kirsch Co., both located at Sturgis, Mich.

EARLE WATSON McMULLEN, Ch. E., resides at 946 Dana Ave., Cincinnati, Ohio. He is with the Eagle Picher Lead Co., Temple Bar Bldg., Cincinnati.

EDWIN W. PETTY, E. E., is electrical design engineer, Chicago Water System, Room 402, 121 N. LaSalle St., Chicago. His home address is 4020 Woodland Ave., Western Springs, Ill.

ROY WHITMAN STURTEVANT, C. E., is an inspector in the U. S. Navy Yard at Portsmouth, New Hampsire, and he lives at York Village, Maine.

WALTER H. WIARD, Ch. E., is chief chemist for the American Steel and Wire Co., DeKalb, Ill. His home is at 557 Lucinda Ave.

FRANK C. ZANZIG, E. E., is mechanical engineer for the bureau of Bridges and Public Bldgs., Room 505 City Hall, Milwaukee, Wis., and his residence is 450 N. 50th St., Milwaukee.

ARTHUR G. ANDERSON, Class 1910, informs us that T. E. RICHARDS, JR., C. E., '09, passed away in August, 1933.

MISSING:
Ahern, J. F., F.P.E.
Chamberlin, E. W., C.E.
Curtis, H. S., E. E.
Dick, Don. D., C. E.
Perrine, A. A., E. E.

DECEASED:
Anderson, H. C., C. E.
Chatain, P. E., Ch. E.

Ebert, A. A., C. E.
Mayes, F. H., M. E.
Ostergren, H. N., E. E.
Richards, T. E., C. E.
Simmons, L. E., E. E.
Spitzglass, J. M., M. E.
Tregay, John, F. P. E.
Urson, F. J. Jr., C. E.
Von Guten, O., Arch.

1910

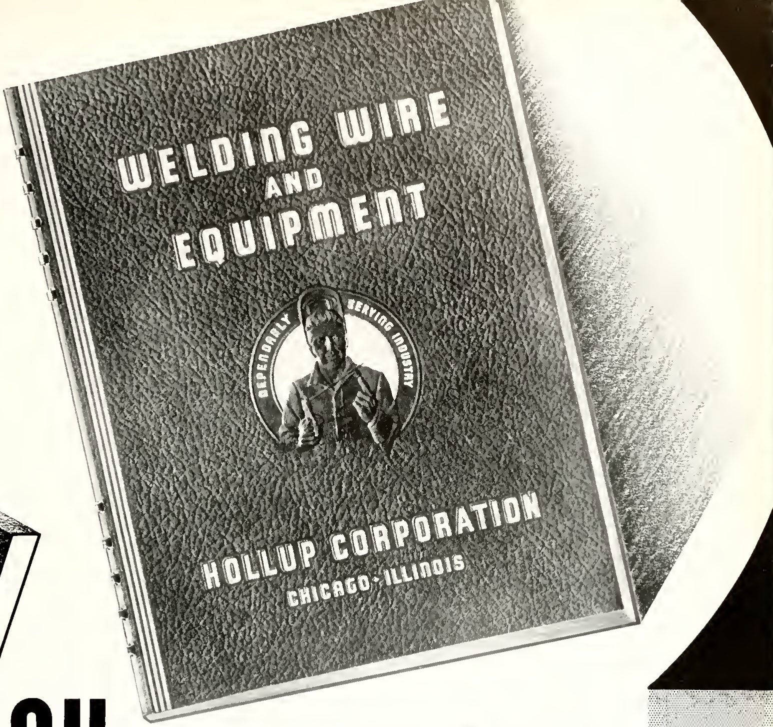
EDWARD ENDICOTT BOLTE, M. E., is with the National Radiator Corp., 1111 E. 82nd St., Chicago, and he resides at 6516 Kenwood Ave.

HENRY J. BREMERS, E. E., is a member of the law firm, Lee and Bremers, 709 Keeline Bldg., Omaha, Nebr., and his home is at 3325 Hickory St.

JOHN M. ECKERT, C. E., is president of J. M. Eckert Co., 5524 Broadway, Chicago, which specializes in fine decorating. Mr. Eckert resides at 520 Laice Ave., Wilmette, Ill.

FRANK OZRO GODFREY, E. E., resides at 403 E. Van Buren St., Chicago. He is division engineer for the Ill. Power and Light Corp., 116 W. Madison St., Ottawa, Ill.

EVERETT W. HOTCHKIN, F. P. E., is manager for the Royal Liverpool Ins.



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Co., 150 William St., New York, N. Y. His residence is 30 Axtell Dr., Scarsdale, N. Y.

HARRY E. MOYES, E. E., is devoting his time to promotional engineering with offices at 874 Broadway, New York, N. Y. His home address is 498 West End Ave.

FRED M. PFAELZER, F. P. E., is president of the Pfaelzer Coal Co., 309 W. Jackson Blvd., and his residence is 1755 E. 55th St., Chicago.

EUGENE M. RUEDE, E. E., is with the Nebr. Power Co., Electric Bldg., Omaha, Nebr., and he resides at 5808 Pierce St.

MISSING:
Crocker, A. H. Jr., M.E.
Gentry, T. E., M. E.
Leavell, R. A., M. E.
MacEwing, E. D., E. E.
Pearce, R. P., C. E.
Thomas, Wm. E., M. E.
Vynne, Eustace, C. E.
Williams, D., C. E.

DECEASED:
Deveney, W. J., C. E.
Kadic, Jos. F., E. E.
Munoz, Fredrico, C. E.
Richards, O. L., E. E.
Squair, F. R., Ch. E.
Wernick, F. E., M. E.
Young, Don. A., M. E.

1911

HAROLD M. ALLING, F. P. E., resides at 150 S. Grand Ave., Pasadena, Calif., and he is associated with the insurance firm of Bayly, Martin and Fay, Roosevelt Bldg., Los Angeles, Calif.

ROY B. AMBROSE, M. E., is building manager for the Carnegie Institute and Library, 4400 Forbes St., Pittsburgh, Pa. Ambrose informs us that he has lived in Pittsburgh for twenty-five years, the first fifteen of which he taught at Carnegie Tech and the last ten years he has held his present position. Mr. Ambrose lives at 7532 Graymore Rd., Pittsburgh.

HYMAN BORNSTEIN, Ch. E., lives at 21 Oak Lane, Davenport, Iowa, and he is director of laboratories at the Deere and Co. plant, Moline, Ill.

EDWARD CHANDLER DOBBIE, E. E., is in the U. S. Engineer Office, Room 625 Pittock Block, Portland, Ore., and his home is at East 1502 16th Ave., Spokane, Wash.

OSCAR RAYMOND ERICKSON, C. E., resides at 7409 Evans Ave., Chicago, and he is with the Leonard Construction Co., 37 S. Wabash Ave. A recent card from Erickson informs us that he is making a trip to Garfield, Utah, and Selby, Calif., in connection with the construction of two sulphuric acid plants.

RALPH N. FRIEDMAN, Arch., resides at 5111 Drexel Ave., Chicago, and he is vice-president of the architectural firm, Alfred S. Alschuler, Inc., 28 E. Jackson Blvd., Chicago.

HARVEY WILLARD JONES, C. E., is superintendent of S. J. Groves and Sons Co., 509 Wesley Temple Bldg., Minneapolis, Minn. His residence is at 4808 Harriet Ave.

JOHN H. KUEHNE, E. E., operates the Kuehne Electric Co., 242 W. Lafayette Blvd., Detroit, and his residence is 16515 Northlawn Ave.

MISSING:
Cleaver, T. G., C. E.
De Tar, De Los, E. E.
Doering, R. C., F.P.E.
Emmons, G. C., E. E.
Gray, R. L., E. E.
Griffiths, F. H., M. E.
Pettibone, G. D., E. E.
Pratt, E. A., C. E.
Salomon, M. J., C. E.
Schmidt, E. J., M. E.

DECEASED:
Bradford, P. L., E. E.
Da Silva, C. J., C. E.
Kellner, O R., C. E.
McCague, J. A., M. E.
Merriman, H. A., Arch.
Miller, P. F., Ch. E.
Moore, W. W., Arch.
Tellin, Wm. G., E. E.

1912

SEYMOUR CLARENCE ANDERSON, C. E., lives at 4216 Overlook Rd., Birmingham, Ala., and he is the Alabama division superintendent of construction for the Standard Oil Co. of Ky.

JERRY C. BLOOMFIELD, E. E., is manager of the railway department of the Link-Belt Co., 300 W. Pershing Rd., and he resides at 742 Cornelia Ave., Chicago.

FRED CHRISTIAN DIERKING, C. E., lives in Fox River Grove, Ill. He is manager of sales promotion for Emil Denemark, Inc., 3860 Ogden Ave., Chicago.

GEORGE C. ERICKSON, E. E., is an electro-chemical radium technician, 130 N. Wells St., and he resides at 4140 Drexel Blvd., Chicago.

SIDNEY KAHN, Ch. E., is vice-president of the Federal Yeast Corp., Colgate Station, Highlandtown P. O., Baltimore, Md.

NORMAN FRANK KIMBALL, M. E., 2316 Genesee St., Utica, N. Y., is with the Martin Cantine Co., Saugerties, N. Y.

We were recently advised that MEREDITH FAY LAWRENCE, M. E., passed away in 1934.

GEORGE DRAPER LEWIS, C. E., 6 S. Lake Ave., Albany, N. Y., is with the New York State Conservation Dept., holding a temporary position and doing construction work.

JOHN G. LEGEL, Arch., is manager of Legel's Store — drugs and groceries — Charles City, Iowa.

WILLIAM ARVID LINDBERG, E. E., resides at 507 Orchard Lane, Winnetka, and he is a development engineer with the Commonwealth Edison Co., Chicago.

GARRETT RAYMOND MEADE, E. E., is electrical engineer with the Illinois Commerce Commission, 1 N. LaSalle St., Chicago, and resides at 114 N. Parkside Ave., Chicago.

CHESTER A. SNOW, F. P. E., is secretary of the Phoenix Ins. Co., 30 Trinity St., Hartford, Conn., and he resides at 87 Sylvan Ave.

RALPH NEUFELD, C. E., resides at 1796 S. W. 12th St., Miami, Fla. He is in the real estate management business, office—Ritz Hotel, Miami, Fla.

BRUCE INGALLS WHITING, Ex. E. E., paid us a visit a short time ago and paid his dues to the Alumni Association so that he would be sure to receive all copies of the Armour Engineer and Alumnus. Mr. Whiting lives at 1425 W. Stephenson St., Freeport, Ill.

MISSING:
Beach, W. E., C. E.
Curren, Earl L., C. E.
Enoshita, Toyozo, E.E.
Hazen, Fred G., E. E.
Newman, J. J., Ch. E.
Strale, Nels W., M. E.
Yoshida, H. T., M. E.

DECEASED:
Bohlander, H. A., M.E.
Dewalt, E. V., Arch.
Hoehn, J. C., Ch. E.
Lawrence, M. F., M. E.
Leviton, M. I., Arch.
Michael, J. C., Jr., E.E.
Peck, Winfield, M. E.

1913

FRED T. BANGS, E. E., is with the George J. Kirkgasser Co., advertising agency, 400 N. Michigan Ave., Chicago. He lives at 5346 Cornell Ave.

WILLIAM T. BRAUN, Arch., is practicing Architecture. Business and home address, 545 E. 89th Place, Chicago.

J. DUDLEY BRADFORD, M. E., is engineer for the Koppers Co., Koppers Bldg., Pittsburgh, Pa. He resides at 229 Garland St., Edgewood, Pa.

AUGUST C. CRAMER, C. E., lives at 1156 N. Concord St., Glendale, Calif., and he is with the Soule Steel Co., 6200 Wilmington Ave., Los Angeles, Calif.

DONALD A. DONDRO (DROZESKI), M. E., has retired from active business and lives at 1918 N. Las Palmas Ave., Hollywood, Calif.

We are very sorry to learn that RALPH W. ERMELING, Arch., passed away in April, 1934.

CHARLES DRAPER FAULKNER, Arch., is practicing architecture with offices at 307 N. Michigan Ave., Chicago, and he resides at 2335 E. 70th St.

PAUL F. GRIFFENHAGEN, C. E., is chief engineer for the engineering firm, Lieberman and Hein, 190 N. State St., Chicago. Griffenhagen resides at 2500 Thayer St., Evanston, Ill.

JOHN HENRY HIBLER, Ind., Arts, is teaching at Parker High School, Chicago, and resides at 7141 Normal Blvd.

CHARLES KOPALD, E. E., is operating an electrical contracting business at 27-29 N. Main St., Minot, N. D.

CLIFFORD M. LARSON, M. E., paid us a visit last month. He is supervising engineer for the Sinclair Refining Co., 630 5th Ave., New York, N. Y., and resides at 19 Mt. Tom Rd., New Rochelle, N. Y.

EMIL G. ZILLMER, Arch., is practicing architecture at 445 Norwood Ave., S. E., Grand Rapids, Mich.

MISSING:
Arp, W. B., E. E.
Connell, Daniel, Arch.
Fisher, H.F.(Isrl.),C.E.
Furay, C. J., Arch.
Garrison, C. W., C. E.
Kuehn, Hugo R., M. E.
Lill, A. C., C. E.
Moore, F. L., Ch. E.
Munn, W. K., Ch. E.
Stanley, H. C., Arch.
Westlund, E. G., C. E.

DECEASED:
Arnold, C. H., F. P. E.
Curtis, Marston, E. E.
Ermeling, R. W., Arch.
Kehr, Chas. F., M. E.
Leibrandt, C. R., C. E.

1914

TOLY AGAZIN, Ch. E., is with the Premier-Pabst Corp., 917 W. Juneau, Milwaukee, Wis., and resides at the Shore Crest Hotel, Milwaukee.

ALBERT G. BAUERSFIELD, Ind. Arts., is principal of Irving Park School, 3815 N. Kedvale, Chicago, and he lives at 1424 Hollywood Ave.

GLEN C. CARNAHAN, Ch. E., is sales manager of the gas appliance department, James B. Clow and Sons, 201-229 N. Talman Ave., Chicago. He resides at 5412 Woodlawn Ave.

JOHN R. CHARLTON, E. E., is division plant engineer for the American Telephone and Telegraph Co., at St. Louis, Mo., and he resides at 715 Fairview Ave., Webster Groves, Mo. Charlton has been with the A. T. and T. for the past twenty-one years, has two lovely daughters, and reports that he thoroughly enjoys gardening, good cigars, and books.

HARRY HIMELBLAU, M. E., is a member of the firm, Himelblau, Byfield & Co., 36 S. Throop St., Chicago, and he resides at 1720 Chase Ave., Rogers Park, Chicago.

LOUIS HIRSH, Ch. E., is an actuary at 134 N. LaSalle St., Chicago, and writes us that he cannot boast of any great accomplishments but feels his two sons have more than made up for what he has not not done. We quote from a letter recently received from Hirsh. *"My older son, Bernard, who by the way, was born during my senior year at Armour, has done quite well in his studies. He graduated from the University of Iowa at 19 with magna cum laude and made the Phi Beta Kappa and Sigma Xi honorary fraternities. He received his Masters Degree at 20 and was then offered a Proctor Scholarship at the University of Oklahoma where he spent one year, after which he was offered a Proctor Scholarship at the University of Michigan. He majored in mathematics and actuarial science. At present he is connected with Professor F. E. Ross of the University of Michigan in his consulting accounting work and he is also an assistant in the Department of Business Administration at the University.*

"My younger son, Albert, has achieved great success and fame as a concert pianist.. He gave his debut recital in New York City in January, 1935, played in a number of important cities in the United States and Canada with great success, and recently made his debut in Chicago at Orchestra Hall."

Hirsh, who is a very loyal alumnus, served as secretary-treasurer of the Alumni Association for a number of years. We congratulate him on the success of his sons.

DAVID B. LESSER, Ch. E., owns and operates the D. B. Lesser Co., 1347 S. Ashland Ave., Chicago, and he resides at 425 W. Surf St., Chicago.

JAMES G. SHAKMAN, Ch. E., is with the Premier-Pabst Corp., 221 N. La Salle St., Chicago, and lives at 35 E. Linden Ave., Wilmette, Ill.

WALTER STEININGER, C. E., is district manager of the Socony-Vacuum Oil Co., Inc., and he is operating the Pa. Oil Co. of Evanston Division, 933 Sherman St., Evanston, Ill. He resides at 410 Lee St., Evanston, Ill.

CHESTER E. WOLFLEY, Arch., resides at 2015 Guilford Rd., Rockford, Ill., and has been practicing architecture continuously, depression and all, since 1919 with offices in the Talcott Bldg., Rockford, Ill.

MISSING:
Auer, P. Fenton, C. E.
Barber, G. S., Arch.
Barr, Allen W., Arch.
Boetler, C. L., C. E.
Case, Harry L., E. E.
Cohen, Joseph, Arch.
Cooley, G. S., M. E.
Eliel, A. G., Arch.
Kann, W. H., C. E.
Morrow, A. W., Arch.
Oldenburger, W.C., C.E.
Roberts, W. F., C. E.
Sevin, Irv. M., C. E.
Shane, Jas. L., Arch.
Smith, H. F., C. E.
Swanson, F. A., E. E.

DECEASED:
Dean, Chas. A., C. E.
Emslie, John M., C. E.
Erickson, H. E., M. E.

1915

STANLEY WILLIAM ANDERSON, F. P. E., resides at 209 S. Madison Ave., La Grange, Ill. He is the proprietor of the insurance firm, S. W. Anderson Co., 565 W. Washington Blvd., Chicago.

WALTER LAMOND BORROUGHS, E. E., is assistant treasurer of the Allen Electric and Equipment Co., Kalamazoo, Mich.

WILLIAM MARLEY BREADY, M. E., is a member of the firm of Bready Bros., Inc., who specializes in power plant equipment, room 2116, 128 N. Wells St., Chicago. Bready lives at 1450 E. 76th St., Chicago.

JOSEPH F. CHAMBERLIN, F. P. E., lives at 406 N. Taylor Ave., Oak Park, Ill. He is engaged in the insurance brokerage business at 82 W. Washington St., Chicago.

ORMOND ROY HUPP, E. E., resides at 7550 Coles Ave., Chicago.

LOUIS LURVEY, Arch., is an estimator for the contracting firm, George D. Hardin, 3139 Indiana Ave., Chicago. His home address is 3425 W. Monroe St., Chicago.

EMMET RAYMER MARX, C. E., has carried on a private practice as a consulting engineer during the past ten years, surveying, irrigation, structural design, and architecture. His home and office are at 2025 E. Third St., Tucson, Ariz.

WALTER SCOTT PFEIFER, E. E., is in the patent department of the Allen Bradley Co., 1326 S. 2nd St., Milwaukee, Wis., and he resides at 2014 E. Jarvis St.

EMIL ALBERT SCHIFFERS, Arch., is with the Mass. Mutual Life Insurance Co., 907 Allen Bldg., Dallas, Tex. He resides at 3237 Rosedale Blvd., Dallas.

EDWIN SAMUEL YOUNGBERG, Ind. Arts, resides at 428 9th St., Wilmette, Ill. He is teaching at the Lane Technical High School, Chicago.

MISSING:
Deitenbeck, Max, C. E.
Harman, E. S., M. E.
Hirose, Yosh., Arch.
Johnson, V. E., C. E.
Mammes, H. A., E. E.
Mieczkowski, T.K., E.E.
Minchin, S. H., Arch.
Parrott, R. D., Ch. E.
Shaffer, Sydney, E. E.
Stark, A. G., Arch.
Willson, H. E., M. E.

DECEASED:
Congdon, C. C., Ch. E.
Grossman, A. N., Ch.E.
Juttemeyer, W.L., M.E.
Norton, Jos. C., C. E.
Palmer, Robt. C., M. E.
Sproesser, G. W., C. E.
Wight, Clifford, M. E.

1916

HARRY B. AARENS, Arch., has his architectural office at 7046 Hollywood Blvd., and resides at 1609 N. Normandie, Los Angeles, Calif.

ARTHUR S. ALTER, M. E., is vice-president of the Harry Alter Co., 1728 S. Michigan Ave. and resides at 20 Cedar St., Chicago.

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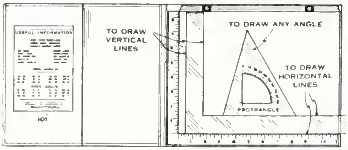

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ELECTRICAL ENGINEERS AND CONTRACTORS
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17 South Jefferson Street
Chicago, Illinois

RALPH B. BROWER, C. E., lives at 1618 Adams St., Madison, Wis., and he is with the Wisconsin State Highway Commission, Division No. 1, State Office Bldg., Madison.

CLARENCE WINFIELD FARRIER, Arch., is now with the National Broadcasting Co., Radio City, N. Y. He was with the Tennessee Valley Authority until January 18th, 1937.

WARREN H. HAMILTON, Arch., is appraiser for the Southern California Bldg. and Loan Ass'n., 431 W. 5th St., Los Angeles, Calif., president of the Los Angeles Chapter, Society of Residential Appraisers, and an instructor in building economics, American Savings and Loan Institute. He resides at 1237 S. Orange Dr., Los Angeles, Calif. Thanks for your help on missing men.

NATHAN ISENBERG, Ch. E., is chief chemist for the coke and tar department of the Inland Steel Co., Indiana Harbor, Ind. His home is at 7722 Essex Ave., Chicago.

HARRY G. MOUAT, M. E., lives at 905 Stuart St., Birmingham, Ala. He is agent for several manufacturers with office room 830, Martin Bldg.

ARCHIE T. NEWSOM, Arch., is a member of the firm, Noble, Newsom and Archie T. Newsom, Arch., 1226 Russ Bldg., San Francisco, Calif. His home address is 5957 Contra Costa Rd., Oakland, Calif.

VICTOR E. MARX, Ch. E., is secretary-treasurer of the American Society of Bakery Engineers and editor of Bakers' Helper, a magazine devoted to bakery practice and management, 330 S. Wells St., Chicago. Marx lives at 1541 Birchwood Ave., Rogers Park, Chicago. Thanks, Marx, for your suggestions on missing men.

HYMEN M. SHAPIRO, E. E., 5443 N. Spaulding, Chicago, is with the Public Utility Engineer and Service Corp., 231 S. LaSalle St., Chicago.

HOWARD LUDWIG WALLBRECHT, Arch., is division manager, Schenley Products Co., 20 W. 40th St., New York, N. Y., and lives at the Hotel De Witt Clinton, Albany, N. Y.

FRED L. WARD, Ex. M. E., has been operating a lumber business continuously since 1916 at Marshalltown, Iowa. He paid us a call a few weeks ago and reported a big improvement in business and fine outlook for the future. A cordial invitation was extended to all Armour men passing his way to pay him a call.

We are sorry to learn that BERNARD M. SMITH, E.E., who had been ill for several months, passed away on Feb. 24. We extend sympathy to his wife and two daughters.

MISSING:
Adams, R. S., C. E.
Apfelbach, H. J., Arch.
Appelbaum, A., C. E.
Armstrong F. C., C. E.
Broman, J. G., M. E.
Eames, E. R., Arch.
Finkelstein, S. C., Arch.
Foy, Edgar A., C. E.
Harris (Katz), H.S., E.E.
Kinnally, R. W., C. E.
McHugh, L. J., C. E.
Miller, Jos. V., M. E.
O'Dea, T. M., Ind.Arts
Sosna, Sam. E., C. E.
Sostheim, B. B., C. E.
Sullivan, Jos. E., C. E.

DECEASED:
Echlin, E. S., M. E.
Hill, Claude, F. P. E.
Rook, Henry A., C. E.
Smith, Bernard M., E.E.

1917

OTTO W. ARMSPACH, M. E., is chief engineer for the Kroeschell Engineering Co., 215 W. Ontario St., Chicago, and his home address is 205 S. Summit Ave., Villa Park, Ill.

JOHN LOUIS BURDA, Ch. E., resides at 1720 E. Cervantes St. He is chemical engineer for the Newport Co., Pensacola, Fla.

MAJOR CHARLES BOLTE, Ch. E., resides at 4433 Q St., N. W., Washington, D. C., and after June 1, 1937, will be stationed at Fort Humphreys, D. C.

WILLIAM HOY CHUN, C. E., is project engineer, County of Hawaii, Room 17, County Bldg., Hilo, Hawaii. Chun reports that they are finishing a one-half million dollar sewage extension project and have a $100,000 reinforced concrete arch bridge under construction in the city of Hilo.

RALPH HILLIARD EARLE, E. E., lives at 206 N. 85th St., Wauwatosa, Wis. He holds the position of research engineer with the Line Material Co., S. Milwaukee, Wis.

LEONARD A. FOSCHINBAUR, F. P. E., is an insurance engineer with Marsh and McLennan, Inc., 164 W. Jackson Blvd., Chicago. He resides at 1119 Miller Ave., Oak Park, Ill.

EDWARD I. FRIEDMAN, Ch. E., is vice-president of L. FRIEDMAN, Inc., 301 N. Michigan Ave., Chicago. He resides at 5543 Hyde Park Blvd.

GEORGE M. FRITZE, M. E., is plant engineer for the U. S. Gypsum Co., 561 Richmond Terrace, Staten Island, N. Y., and he resides at 32 Tompkins Circle, Staten Island.

HAROLD GILLETTE INGRAHAM, Arch., is assistant to the president of the Bird Machinery Co., manufacturers of pulp and paper mill machinery, also batch and continuous centrifugal machinery for general industrial use, at S. Walpole, Mass. His home is at 6 Van Brunt Ave., Dedham, Mass.

HOWARD BRUCE MAGUIRE, F. P. E., is manager of sales for the American Steel and Wire Co., at the Detroit office 9-236, General Motors Bldg., Detroit, Mich. Residence, 120 Glynn Court, Detroit.

LLOYD ELDON MELLOR, Arch., residence and architectural office at 524 E. 87th St., New York, N. Y.

ARMIN LAWRENCE SCHREIBER, C. E., 1905 Woodlyn Rd., Pasadena, Calif., is superintendent of the Vernon Potteries, Ltd., 2300 E. 52nd St., Los Angeles, Calif.

WILLIAM THOMAS WATT, E. E., vice-president and general manager, Maujer Publishing Co., Maujer Publishing Bldg., St. Joseph, Mich. Residence, 2308 Niles Ave.

MISSING:
Cooper, Earl C., M. E.
Goldberg, L. I., C. E.
Hall, Ken. V., F. P. E.
Kendall, S. W., Ch. E.
Morse, Ralph L., M. E.
Prochazka, R. V., E.E.
Turner, J. W., Arch.
Vesely, Wm. J., Arch.

DECEASED:
Anderson, J. E., E. E.
Bechaud, J. P., M. E.
Cowles, Ray D., F.P.E.
Goorskey, N. J., Ch. E.
Hankan, W. M., Ch. E.
Zimmerman, A., E. E.

1918

STANLEY L. EVANS, F. P. E., lives at 4940 N. Cumberland Blvd. He is president of the Stanley Evans Agency, for insurance at 207 E. Michigan St., Milwaukee, Wis.

ORREN L. HAILEY, JR., Ch. E., is chief chemist for the Lone Star Cement Corp., 1402 Santa Fe Bldg., Dallas, Texas. He resides at 4210 Gilbert St.

RALPH HAYES RUSK, F. P. E., lives at 811 E. State St., Apt. 22, Milwaukee, Wis. He is company commander, 2670th Company CCC, Madison, Wis.

HAROLD H. SHOTWELL, E. E., is

with the Supreme Instrument Co., Howard St., Greenwood, Miss. He resides at 1110 S. Blvd., Greenwood.

ROMAN JAMES SEDLACEK, E. E., resides at 2224 S. Oak Park Ave., Berwyn, Ill. He is with the Cook County Highway Dept., 188 W. Randolph St., Chicago.

ARTHUR UHLIR, Ind. Arts., is elementary principal of the Foster-Haven Schools, 720 O'Brien St., Chicago.

FRANCIS BROOKE VOGDES, E. E., is a sales engineer for Wm. R. Thropp and Sons Co. (air conditioning department, G. E. Co.), 163 E. Front St., Trenton, N. J. Residence, Central Y. M. C. A., Trenton. Thanks for your letter. We shall be expecting a visit in the very near future.

WILLIAM CAMPBELL WRIGHT, Arch., resides at 804 Elmwood Ave., Evanston, Ill. His architectural office is at 140 S. Dearborn St., Chicago.

MISSING:
Andre, Guy L., M. E.
Durham, Edw. J., M.E.
Erickson, R. A., E. E.
Kerr, Volney A., M. E.
Koehler, W. W., Ch. E.
Lewin, Edw. P., Arch.

DECEASED:
Newlander, R. A., E.E.

1919

HAROLD GUTHRIE ANDERSON, M. E., says, *"I sure have enjoyed the last few issues of the Armour Engineer and Alumnus—best regards to all."* Anderson resides at 19 Ramsey Place, Albany, N. Y., and owns and operates Harold G. Anderson - Distributors, 177 Watervliet Ave., Albany.

CLARENCE BENSON CLARK, Ch. E., is with the Corn Products Refining Co., Argo, Ill., and resides at 131 S. Waiola Ave., LaGrange, Ill.

HUBERT FRED REHFELDT, M. E., is with The Peoples Gas Light and Coke Co., 122 S. Michigan Ave., Chicago. Residence 2255 Giddings St., Chicago.

MISSING:
Cowles, F. S., Arch.
Dady, Wm. E., Arch.
Geldmeier, H. F., E. E.
Gold, Carl L., C. E.
Mintz, Chas. W., F.P.E.
Schimek, A. F., Arch.
Senescall, Clyde. C. E.
Wallace, M. R., Arch.
Wilbor, John B., Ch. E.
Wilson, M. M., Ch. E.

DECEASED:
Erickson, A. E., Arch.
Marks, Robt. E., M. E.

1920

A recent card from SIGMUND V. ABLAMOWICZ, Arch., informs us that he resides at 2941 N. Talman Ave, and has a position in the office of the Q. M., 6th Corps Area, Room 1049, U. S. Post Office Bldg., Chicago.

HOMER ELLERY ANDERSON, C. E., is with the New York Life Ins. Co., 1 Montgomery St., San Francisco, Calif.

ELLIS CYRIL COOK, M. E., informs us that he is secretary of C. H. Hettinger Dental Labs., Inc., 1114 Grand Ave., Kansas City, Mo., and that his residence is 3917 Roanoke Rd.

WILLIAM SERRILL EAGLE, Ch. E., is with the National Aniline and Chemical Co., 351 Abbott Rd., Buffalo, N. Y. Residence, 387 Voorhees Ave.

THOS. WINSLOW HALL, M. E., is assistant advertising manager for the Carborundum Co., Niagara Falls, N. Y., and resides at the Niagara Club.

CHARLES FORD HOLMES, E. E., paid us a visit the early part of January. Holmes owns and operates the Independent Electrical Works, 4554 Malden St., Chicago. He resides at 1019 Balmoral Ave.

A recent card from MILTON MARKS, M. E., 446 Surf St., Chicago, informs us that he is trying to recover from an accident which occurred two years ago. We are indeed sorry to hear of his misfortune. We hope for a complete recovery.

WALTER M. SEYFERLICH, E. E., 5433 N. Ludlam Ave., Chicago, is in the electrical division of the testing department of the Sanitary District, City of Chicago, 31st St. and Western Ave., Chicago.

MISSING:
Adam, Paul J., M. E.
Bloomberg, S., E. E.
Fainstien, M., C. E.
Frank, Julian, C. E.
Karlson, Jos., Arch.
McEldowney, H.B., Arch.
O'Conner, W. J., Arch.
Peterson, H. C., M. E.
Podolsky, D. H., Ch. E.
Popkin, J. L., Arch.
Smely, Jas., E. E.
Sparling, D. C., Arch.
Stein, Aaron, C. E.
Stevers, H. D., E. E.
Wong, Yuk Man, M. E.

DECEASED:
Bentley, W. J., Ch. E.
Malpede, D. J., E. E.

1921

STANLEY HERMAN BARCE, M. E., 11347 Parnell Ave., Chicago, is president of Harper and Barce, Inc., heating, ventilating, and refrigeration engineers, 11017 Michigan Avenue, Chicago.

HARLAN WILSON BIRD, M. E., 1722 Thome Ave., Chicago, is a distributor's representative with office at 111 W. Washington St., Chicago. Thanks, Bird, for your card; have located FRED NORWOOD WILSON, '06.

A recent card from RICHARD JOSEPH GRANT, E. E., 7728 Merrill Ave., Chicago, informs us he is with the Commonwealth Edison Co., Room 620, 72 W. Adams St., Chicago.

HERBERT A. MANN, C. E., 5254 Magnolia Ave., Chicago, is assistant superintendent, St. Joseph Cemetery, River Grove, Ill., in charge of construction, maintenance, and lot sales.

JULIUS M. NAIMAN, E. E., and M. E., 9600 Dexter Blvd., Detroit, Mich., is a consulting engineer at 503 Water Board Bldg. He has devoted a great deal of time to the study of gas rates, gas measurements, and the development of gas meters.

We are just informed that EMIL WILLIAM PFAFFLIN, Ch. E., resides at 3335 Washington Blvd., Indianapolis, Ind., and that he is with the Indiana Inspection Bureau, 320 N. Meridian St.

JOHN AUGUST SCHOENING, Arch., is with Harold Spitznagel, Arch., 309 Western Surety Bldg., Sioux Falls, S. D., and resides at 102 E. Euclid Ave.

MARYAN F. WINIARSKI, Arch., 2939 N. Talman Ave., Chicago, is an architect in the U. S. Army, Sixth Corps Area, New Post Office Bldg., 433 W. Van Buren St., Chicago, Ill.

MISSING:
Bloom, Louis S., E. E.
Browde, A. M., Arch.
Kaplon, Hilton, Ch. E.
Mundt, Edw., C. E.
Muramoto, D. K., E. E.
Newman Dr. L.B., M.E.
Pearce, Wm. W., E. E.
Zahrobsky, G. J., E. E.

DECEASED:
Burke, S. J., C. E.
Ermeling, W., Ind.Arts
Grabendike, C. A., E.E.
Little, Jos. H., Ch. E.
Lyon, Wm. K., C. E.

1922

GILBERT V. BRADBURY, M. E., is in the contracting business and owns and operates his own firm, 2516 Summit St., Kansas City, Mo.

Found at last and going full speed ahead, JEFF CORYDON, JR., M. E., 53 Welfare Ave., Auburn, Providence, R. I., president of % Proportioneers, Inc., 9 Codding St., Providence. Jeff is the proud father of two children, a son, Jeff the 3rd, 8 years old, and a daughter, Donna Alice, 4 years old.

HYMAN H. GERSTEIN, Ch. E., 8229 Langley Ave., Chicago, is a sanitary engineer, Division of Water Purification, City of Chicago, Navy Pier, Chicago.

E. A. GOODNOW, E. E., is engaged in sales work for the Dearborn Chemical Co., 310 S. Michigan Ave., Chicago. He resides at 70 N. Longcommon Rd., Riverside, Ill., and informed us on a recent visit that a daughter arrived in their home about one year ago.

CLARENCE A. HERBST., Ch. E., 206 Merrill Ave., Park Ridge, Ill., is chemist for the Economy Fuse and Mfg. Co., Palatine, Ill.

FRED G. HOCHRIEM, E. E., is with the Kelburn Engineering Co., 600 W.

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JOHN WM. RODDICK, F. P. E., is a member of the firm, Roddick and Son, Ins., 175 W. Jackson Blvd., Chicago, and resides at 722 Roger Ave.

A recent card from JOHN B. THOMPSON, E. E., brings the information that he is associated with Harris and Ewing, 1313 F. St., N. W., Washington, D. C., and resides at 1113 Seminary Rd., Silver Spring, Md.

MISSING:
Bernstein, Jacob, C. E.
Bissel, Woodridge, M.E.
Conner, Geo. D., Arch.
Davis, A. A., Jr., Ch.E.
Eierdam, E. C., C. E.
Eisenstein, Sam'l, M.E.
Erlandson, N. H., E. E.
Gambal, John J., C. E.
Georgevick, Elias, M.E.
Herman, B. S., M. E.
Mason, E. B., C. E.
McCormack, W. J., Arch.
Paque, W. W., M. E.
Rehnquist, P. A., M. E.
Silverberg, S., Ch. E.
Walt, Jas. H., C. E.

DECEASED:
None.

1923

GEORGE GRAHAM BLAIR, F. P. E., 50-11 Queens Blvd., Woodside, L. I., is engineer for Johnson and Higgins, 40 Wall St., New York, N. Y.

ORA L. COX, F. P. E., 517 Greencraig Rd., Brentwood, Los Angeles, Calif., is engineer for Johnson and Higgins of Calif., Union Oil Bldg., Los Angeles, Calif.

RALPH D. FISHER, E. E., 1328 13th St., Moline, Ill., is with M. J. Torrence Elec. Co., Rock Island, Ill.

CHARLES S. FRINK, C. E., is with the Dow Chemical Co., Midland, Mich., and resides at 206 E. Carpenter St.

A recent card from ALBERT R. HANSEN, Arch., informs us that he is associated with Scott-Burr Stores Corp., 430 W. Randolph St., Chicago, and resides at 5417 University Ave.

MANFRED B. KREBS, E. E., 7929 Euclid Ave., Chicago, is with the Commonwealth Edison Co., 72 W. Adams St.

FRED A. MANSKE, M. E., resides at 62 Enola, Kenmore, N. Y. He is assistant to the president of the National Gypsum Co., Buffalo, N. Y., and is in charge of production. Manske is the proud father of twin baby boys less than a year old, *"who are future students for Armour Tech."*

A recent lead enabled us to locate WM. HOWARD O'BRIEN, C. E., who is now with the Southern Pine Ass'n., Interstate Bank Bldg., New Orleans, La.

RICHARD L. RUMELY, Ch. E., 3020 Sheridan Rd., Chicago, is assistant testing engineer for the Commonwealth Edison Co., Testing Dept., 2233 S. Throop St.

ROBERT C. TROW, Arch., is in the construction dept. of Swift and Co., U. S. Yards, Chicago, and he resides at 417 N. Spring St., LaGrange, Ill.

MISSING:
Bland, Henry, E. E.
Clark, A. S., Arch.
Crane, W. O., E. E.
Dolesh, F. J., E. E.
Downs, F. C., Ch. E.
Goldberg, D. B., C. E.
Goldstein, A., M. E.
Graicunas, V. A., M E.
Mandel, D. M., C. E.
Miller, D. F., E. E.
Oboler, Max O., E. E.
O'Brien, Wm. H., C. E.
Pollan, H. T., M. E.
Prentiss, Edw. W., C.E.
Rutishauser, D. E., M. E.
Schwartz, M. L., E. E.
Sommers, L. H., Arch.
Worley, J. C., F.P.E.

DECEASED:
Mills, Paul R., M. E.

1924

JOHN O. AALLBERG, E. E., resides at 157 S. Martel St. He is engineer for the R. K. O. Studios, 780 Grover St., Hollywood Station, Los Angeles, Calif.

SHERMAN LEE CHANEY, Ind. Arts, is teaching in the Venice High School, Venice, Calif., and resides at 10537 Dunleer Drive, Los Angeles, Calif.

CHARLES STEWART COLE, F. P. E. is special agent for the Home Insurance Co. of N. Y., with offices at 40 Broad St., Boston, Mass. Residence, 156 Mt. Vernon St., Winchester, Mass.

ROBERT V. FARO, Arch., is with Schmidt, Garden, and Erikson, 104 S. Michigan Blvd., Chicago.

RUSSELL B. GROVE, F. P. E., lives at 933 Sovolla Ave., Coral Gables, Fla. He is claim agent for the Florida Power and Light Co., Miami, Fla.

JOSEPH D. HAYES, E. E., resides at 2716 S. Westnedge, Kalamazoo, Mich., and is the proud daddy of a daughter, Catherine Ann, 2½ years. He is manager for the Matthews Dairy, 1211 S. Burdick St., Kalamazoo.

OSCAR J. JENKINS, C. E., 714 N. Merridian St., Brazil, Ind., is city civil engineer and superintendent of water works for the city of Brazil.

RUDOLPH P. LOWE (Rudy), M. E., is vice-president and secretary of % Proportioneers, Inc., 9 Codding St., Providence, R. I. His residence is 100 Welfare Ave., Cranston, R. I.

FRED J. MARCO, E. E., is consulting engineer and resides at 1099 Jeanette Ave., DesPlaines, Ill.

ALEXANDER I. NEWMAN, M. E., is vice-president and director of both the Precision Scientific Co., and the Freas Thermo-Electric Co., 1750 N. Springfield Ave., Chicago, Ill. Residence, 6 S. Mason Ave., Chicago.

CHARLES A. RIETZ, Ch. E., 6426 Wayne Ave., is chemist for the International Printing Ink Corp., 2211 Elston Ave., Chicago, Ill.

HARRY SOLOMON, C. E., 1651 Pratt Blvd., Chicago, is with the Link-Belt Co., 300 W. Pershing Rd., Chicago.

CLAUDE ALBION STIEHL, Arch., is practicing architecture in Honolulu. Business address, 435 Damon Bldg., and residence, 3566 Woodlawn Dr., Honolulu, T. H.

JAMES C. WALLER (James W. Cohn), E. E., 5511 W. Washington Blvd., Chicago. Business, Golde-Ranbo Co., Elec. supplies, 1351 W. 37th Pl., Chicago.

JOHN LEE WALSH, M. E., paid us a visit several weeks ago. He is general manager of the May Oil Burner Corp., Baltimore, Md., and resides at 5107 Roland Ave.

MISSING:
Anderson, H. E., Arch.
Baim, Eugene, Ch. E.
Bensinger, E. A., Ch.E.
Brown, M. L., C. E.
Falconer, J. W., E. E.
Friedman, H. C., C. E.
Greenfield, T.(Is.).Ch.E.
Hardwicke, L. C., C. E.
Hart, Thos. H., E. E.
Johnson, E. A., Arch.
Lipsky, Wm. S., M. E.
Murner, H. K., C. E.
Nelson, Carl A., M. E.
Olson, Alden T., C. E. P. E.
Samuels, Saul, C. E.
Spaid, Orieon M., F.
Swanson, E.J., Ind.Arts
Vickers, Wm. H., M.E.
Walk, Edw., C. E.

DECEASED:
Almendinger, H.A., E.E.
Finkelstien, L. M., E.E.
Heller, Duane L., M.E.

1925

ANDREW A. ANDERSON, E. E., resides at 24 Jackson Ave., Toronto, Can. He is with the Canada Jefferson Electric Co., Ltd., 535 College St., Toronto.

EARLE G. BENSON, M. E., 7757 Merrill Ave., Chicago, is employed in the Bridge Division, Dept. of Public Works, City of Chicago, Room 1001-A City Hall, Chicago.

LOUIS M. ENDRES, E. E., is electrical engineer, Branch of Bldgs. Management, National Park Service, Room 1707-A, Navy Bldg., Washington, D. C., and resides at 526 Rox Boro Place, N. W., Washington.

EARLE R. GEIGER, Ch. E., is with the U. S. Gypsum Co., at Plasterco, Va. He reports a family of wife and two children.

LELAND R. HOFF, F. P. E., 1420 S. Taylor St., Little Rock, Ark., is with the Arkansas Fire Prevention Bureau, 512 Hall Bldg., Little Rock.

ALBERT C. HOLMQUIST, E. E., is with The Milwaukee Electric Ry. and Light Co., 231 Michigan St., Milwaukee, Wis. His home is 1929 N. 83rd St., Wauwatosa, Wis.

LYNN M. LATTA, F. P. E., has a position with the Travelers Fire Ins. Co., 1000 Republic Bldg., Seattle, Wash., and resides at 2007 19th Ave., N.

WILLIS J. McCAULEY, Arch., 6708 Constance Ave., Chicago, is with the Celotex Corp., 919 N. Michigan Ave., Chicago.

A. ERWIN NICOLAI, Arch., 1524 E. 59th St., Chicago, is with Schmidt, Garden and Erikson, 104 S. Michigan Ave., Chicago.

EMERY M. PRONGER, Ch. E., is with the Veederberg Power Co., Veederberg, Ind.

H. WALTER REGENSBURGER, M. E., was recently transferred to Atlanta, Ga., as chief engineer of the Atlanta plant, Link-Belt Co., 1116 Murphy Ave., S. W. He resides at 423 Clairmont Ave., Decatur, Ga. Our best wishes for your continued success.

JESSE K. STAHL, M. E., resides at 415 S. 49th St., Philadelphia, Pa. He is development engineer for the Roller Bearing Co., Inc., Trenton, N. J.

JOHN H. SCHROEDER, E. E., 1607 Thome Ave., Chicago, has been with the Commonwealth Edison Co., Room 830, Edison Bldg., 72 W. Adams St., Chicago, continuously since graduation and is now design engineer in charge of overhead and underground line construction.

HARRY P. WHITEHILL, Ch. E., 4150 N. Ashland Ave., Chicago, is a salesman for E. I. DuPont De Nemours & Co., 2100 Elston Ave., Chicago.

EDWARD FRANCIS WEBB, C. E., is construction engineer, Public Bldg. Branch, Procurement Div., Federal Warehouse, Washington, D. C. Webb gives his home address as 404 W. 2nd St., Muscatine, Ia.

MISSING:
Beck, M. D., Ch. E.
Gaylord, R. P., F. P. E.
Johnson, J. G., Ch. E.
Larkin, Clif. E., E. E.
McFaul, Don. J., M. E.
Norton, H. E., Ch. E.
Nudelman, C. S., C. E.
Ostland, R. E., C. E.
Prendergast, R.W., Arch.
Rose, Geo., Jr., M. E.
Schwarz, Edwin, E. E.

DECEASED:
Gaul, Carl C., C. E.
Taylor, Von D., F.P.E.

1926

L. DEAN ALBER, F. P. E., resides at 14630 Grandville Ave., Detroit, Mich. He is with the Home Insurance Co., 2380 Penobscot Bldg., Detroit.

HAROLD ALTERMATT, M. E., is assistant production estimator, U. S. Army, Rock Island Arsenal, Rock Island, Ill. He lives at 2002 Tremont Ave., Davenport, Iowa.

EDWARD ALBERT ARMIT, Ch. E., 538 S. Euclid Ave., Oak Park, Ill., is teaching chemistry in the Chicago Public Schools.

EARL BUSCH, Arch., is with Montgomery Ward & Co., DuBois Bldg., Congress Park, Ill.

W. M. BAIRD, Arch., resides at 6541 S. Woodlawn Ave., Chicago.

WILLIAM E. DOWNES, JR., C. E., 6848 Bennett Ave., Chicago, is assistant engineer, Bureau of Engineering, City of Chicago, 2352 S. Ashland Ave., Chicago.

JOHN CHADWICK GOORSKEY, F. P. E., is resident engineer with the Western Sprinkled Risk Assn., 3042 A. I. U. Citadel, Columbus, Ohio, and resides at 1972 Guilford Rd., Columbus. Goorskey informs us that he is convalescing from an illness and major operation that occurred in 1936. Thanks in behalf of the Armour Alumni for your New Year greetings, and a speedy and complete recovery to the best of health is our message to you.

LESTER E. GRUBE, E. E., is operating a brokerage business under his own name at 721 New York Ave., Sheboygan, Wis., and resides at 2315 N. 6th St.

JOHN EARL HARRINGTON, Ch. E., is chemical engineer for the Bureau of Engineering, City of Chicago, 3100 S. Sacramento Ave., Chicago, and lives at 2458 Greenleaf Ave.

HENRY M. HARRIS, F. P. E., is a member of the firm, Bonner & Campbell Insurance Brokers, 5658 Wilshire Blvd., Los Angeles, Calif., and he resides at 1169 Amalfi Dr., Pacific Palisades, Calif. Harris owns and operates a 1,000-watt amateur radiophone transmitter on the four and fourteen megacycle short wave bands. The transmitter call is W6LLQ, and the station is located at Pacific Palisades, Calif.

ALBERT FREDERIC HEINO, Arch., is practicing architecture at 11059 Hale Ave., Chicago, and resides at 11426 Hale Ave.

EDWARD H. MARHOEFER, JR., C. E., 2219 Arthur Ave., Chicago, is president of E. H. Marhoefer, Jr., Co., general contractors, Room 1506, Merchandise Mart, Chicago.

SAMUEL JOS. McLAREN, JR., F. P. E., 1953 Suffolk Rd., Columbus, Ohio, is with Crum and Forster Ins. Co., 406-8 Citizens Bank Bldg., Columbus, Ohio.

GROVER O. MELBY, C. E., is with the Chicago Surface Lines and resides at 1729 N. Narragansett Ave., Chicago.

A letter from FERNANDO C. MEYER, Ch. E., states that he is far from being missing and that he is employed as a sales engineer by Lammert and Mann Co., oil burners, Wood and Walnut Sts., Chicago, and lives at 1336 Hyde Park Blvd. *"I have recently met several of my class mates, and it has been our unanimous opinion that the Engineer and Alumnus is a great welding force, which tends to hold interests that are seemingly divergent, and bring them together under a common bond."*

OLIVER PAUL ROBINSON, E. E., is with the Cutler-Hammer, Inc., 400 W. Madison St., Chicago, and lives at 7730 Colfax Ave.

LIONEL CLAUDE SENESCALL, Arch., 1232 N. 7th St., Sheboygan, Wis., is a member of the firm, Satre and Senescall, Architects, 802 Michigan Ave., Sheboygan.

DOUGLAS R. STIEHL, M. E., is with the International Cedar Division of the Oregon Products Co., Marshfield, Ore.

JOHN EDWARD TATAR, Ch. E., 5730 Roscoe St., Chicago, is with the Royal Baking Powder Co., subsidiary of Standard Brands, Inc., 1015 Independence Blvd., Chicago.

VENCESLAUS J. ZUKOWSKI, C. E., 2210 Walton St., Chicago, is with Greeley and Hansen, 6 N. Michigan Ave., Chicago.

MISSING:
Becker, Geo., Arch.
Blume, L. J., Arch.
Gambell, C. H., M. E.
Jacobs, Leo B., Arch.
Kornacker, F. J., C. E.
Reeder, C. D., E. E.

DECEASED:
Chatroop, L. W., C. E.
Norrgard, E. G., M. E.
Ruddock, R. D., C. E.

1927

JOHN B. BRIGHTMAN, E. E., 1153 Keyes Ave., Schenectady, N. Y., is in the Refrigeration Engineering Dept. of the General Electric Co., Schenectady.

THOMAS P. CAMP, Ch. E., is in the research department of the U. S. Gypsum Co., Bldg. Materials Research Labs., 1253 Diversey Pkwy., Chicago, and resides at 321 Brandon Ave., Glen Ellyn, Ill.

FRANCIS J. CARLIN, C. E., is with the Carbide and Carbon Chemicals Corp., S. Charleston, W. Va., and lives at 1524-D Hansford St.

DONALD B. DAVIDSON, F. P. E., is Fire Special Agent, Loyalty Group, 207 Guaranty Bldg., Indianapolis, Ind. Residence 433 W. 43rd St.

CYRIL C. FRASER, M. E., is chief engineer for the Wander Co., Villa Park, Ill., and resides at 610 S. Euclid Ave., Villa Park.

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1624 S. Keeler Ave.
Chicago, Illinois

WILLIAM W. GOTHARD, C. E., lives at 1027 Arlington Ave., LaGrange, Ill. He is with the Domestic Engineering Publications Co., 1900 S. Prairie St., Chicago.

W. I. HANSON, E. E., is field engineer for the Western Factory Insurance Assn., 175 W. Jackson Blvd., Chicago. He is located at Louisville, Ky., and resides at 2614 Whittier Ave. Hansen says: *"still trying to delve into manufacturing intricacy, power equipment, and product, with the desire to minimize interruptions and consequent losses. Have met and worked with many Armour Tech men, which is very satisfying to me."*

JAMES W. KENT, F. P. E., 1025 Cherry St., Springfield, Mo., has been in charge of the Missouri Inspection Bureau branch office at 632 Landers Bldg., Springfield, since May, 1934.

JOHN LEWIS KNAPP, M. E., resides at 334 E. Aurora St., Homewood, Mich. He is Rector of the Episcopal Church of the Transfiguration. He writes: *"I have been an Episcopal Minister for five years and find it a new and vivid form of Human Engineering. Would like to be notified of date of Spring Alumni Banquet so that I may attend."* Please note date, Tuesday, May 25; and don't disappoint us by not coming.

JOHN J. KOEPER, C. E., Perryville, Mo., is engineer, superintendent, and member of firm, S. W. Harwick Co., Marked Tree, Ark.

FREDERICK W. LOEB, E. E., is with Spiegel, Inc., 1059 W. 35th St., Chicago, and resides at 5214 Kenwood Ave., Chicago.

FREDERICK C. STEINHANS, Arch., is a designer in the office of Edgar A. Stubenrauch, Arch., 809 N. 8th St., Sheboygan, Wis., and resides at 624 Geele Ave.

WILLARD T. WILSON, M. E., 7428 Euclid Ave., Chicago, is a tool designer for the Chicago Screw Co., 1026 S. Homan Ave., Chicago. Wilson is secretary of the Chicago chapter of the American Society of Tool Engineers.

ELLIOTT C. YOUNGBERG, Ch. E., is with McKinsey Wellington & Co., 135 S. La Salle St., Chicago. He has been in Pittsburgh, Pa., for the past year working on an engagement with the U. S. Steel Corp. and subsidiaries involving a study of organization and procedures.

MISSING:
Barfield, N. D., Arch.
Berkson, Aaron, Arch.
Cailles B. A., C. E.
Emerson, R. W., Arch.
George, H. R., Jr.,M.E.
Hall, Perry C., E. E.
Heinrich, R. L., M. E.
Heyes, A. B., E. E.
Jung, Carl L., M. E.
Larson, E. A., E. E.
Lee, Geo. H., E. E.
Madden, E. H., E. E.
Mazzone, S. A., Arch.
Ohlinger, Leo O., C. E.
Schesch, Carl, M. E.
Uebele, Geo. F., C. E.
Verano, Victorio, C. E.
Weinberg, Jos., E. E.
DECEASED:
Lamm, M. H., M. E.
Urban, J. W., Ch. E.

1928

MILTON J. ABRAHAMSON, C. E., resides at 1417 Holmes Ave., Springfield, Ill. He is with the Illinois Division of Highways, Room 10, Centennial Bldg., Springfield.

KARL C. ANDERSON, Arch., 4837 N. Lincoln St., Chicago, is with Skidmore and Owings, Archs., Monroe Bldg., Monroe St. and Michigan Ave., Chicago.

LESLIE J. ANDERSON, E. E., is a photophone engineer with the RCA Manufacturing Co., Camden, N. J., and resides at 337 Westmount Ave., Westmount, N. J.

EUGENE C. BACOT, JR., C. E., 3056 Hartzell St., Evanston, Ill., is with the Factory Mutual Fire Insurance Cos., Room 2012, Conway Bldg., 111 W. Washington St., Chicago.

HAROLD V. BURKE, F. P. E., is with the Mountain States Insurance Service Bureau, Denver, Colo., and lives at 2322 Vine St., Denver.

J. THORNTON CLARK, F. P. E., resides at 87 Grove Ave., Highland Park, Mich., and he is in the engineering dept. of the Detroit Ins. Agency, 502 Fisher Bldg., Detroit, Mich. *"After a mental survey of my classmates, I'm still not sure whether my single blessedness is a sign of weakness or of strength. Tell the boys my latchstring is out for all of them when they are in Detroit."*

PHILIP S. DIEWERT, F. P. E., lives at 3429 College Ave., Indianapolis, Ind., and he is with the W. P. A.

LAURENCE V. EFNER, M. E., is a patent examiner in the U. S. Patent Office, Div. 47, Washington, D. C., and resides at 1236 Raum St., N. E.

EVERETT E. GRAMER, E. E., is vice-president of the Standard Transformer Corp., 850 Blackhawk St., Chicago. He resides at 5658 N. Artesian Ave.

JOHN W. HEIMASTER, Ch. E., is with the Carbide and Carbon Chemicals Co., S. Charleston, W. Va. His home address is 1012 Main St.

FRED O. JOHNSON, Ch. E., is chief chemist at the Wisconsin Steel Works of the International Harvester Co., 2701 E. 106th St., Chicago. Residence, 7401 Wabash Ave., Chicago.

ELMER B. KAPKE, M. E., lives at 6328 W. Chamber St., Milwaukee, Wis., and he is with the Wadham Oil Co.-Socony Vacuum, 901 S. First St., Milwaukee.

WILLIAM W. KERR, JR., C. E., is with the Chicago and North Western Railway, Room 332, Passenger Terminal, Canal and Madison St., Chicago. Residence, 817 Lake St., Oak Park, Ill. Kerr reports that he is employed as instrument man—engineering maintenance—and that his present work is on track alignment and bridge betterments in connection with faster train schedules and higher speeds.

MYRON RAYMOND KLEIST, E. E., resides at 3477 Corsa Ave., Bronx, N. Y., and he has a position with the Bell Telephone Labs., 463 W. St., N. Y.

FRANK M. KRATOKVIL, E. E., is a federal radio inspector in charge of the tenth district, 464 Federal Bldg., Dallas, Tex. He resides at 2835 W. Brooklyn Ave.

THOMAS A. MADDEN, Arch., resides at 5541 S. Everett Ave., Chicago. He is with the Public Works Administration, and, at present, at the Dixon State Hospital, Dixon, Ill.

THOMAS E. MILCHRIST, Ch. E., lives at 7622 Normal Ave., Chicago, and he is with the O'Cedar Corp., 4501 S. Western Ave., Chicago.

J. V. REINHART, F. P. E., is assistant examiner of the Federal Hardware and Implement Mutuals, Stevens Point, Wis. We quote the following from a recent letter received from Reinhart: *"Just read the December number of Armour Engineer at the home of another alumnus. I am guilty of great neglect in keeping you posted on change of address. In order to catch up with matters, I will give a thumb-nail sketch of our organization and some help on lost Armour Tech men."*

MISSING:
Bech, Jose A., M. E.
Bernstein, B., M. E.
Brown, Robt. N., Ch. E.
Gustafson, G. A., E. E.
Higgins, E. J. S., Arch.
Jones, C. S., E. E.
Miller, Leo, F. P. E.
Ogden, Tom, C. E.
DECEASED:
Everly, A. H., E. E.
Kleinert, G.W.,Jr., E.E.
Patterson, J. R., M. E.
Wright, C. O., M. E.

1929

JOSEPH F. ALBANO, Arch., resides at 1538 Grenshaw St., Chicago. He is with the Universal Oil Products, Strauss Bldg., Chicago.

WILLIAM E. BRIGGS, E. E., is inspection foreman in the precision test dept., Plant No. 1, Frigidaire Corp., Day-

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ton, Ohio. Residence, 30 Telford Ave., Dayton.

WILLIAM J. BUGGY, F. P. E., resides at 3015 N. Pennsylvania Ave., Indianapolis, Ind. He is with the Automobile Insurance Co., 10th Floor, Illinois Bldg., Indianapolis, Ind. Thanks for the information on missing men in your recent letter.

SEYMOUR F. GOODHEART, Ch. E., 1823 Spruce St., Philadelphia, Pa., is with Frederick H. Levy Co., Inc., 1223 Washington St.

JOEL M. JACOBSON, C. E., is staff engineer Glenn L. Martin Co., Baltimore, Md., and resides at 5212 Hartford Rd. Jacobson sends regards to everyone and mentions the fact that they can use some experienced engineers in aeronautics.

CHARLES F. JILLSON, E. E., is salesman for W. C. Richie & Co., 8855 Baltimore Ave., Chicago, manufacturers of set-up paper boxes, fibre and tin-end cans, etc. Residence, 6435 Yale Ave., Chicago.

J. MELVIN KERNAN, C. E., 1337 Fargo Ave., Chicago, is in charge of the standards department of the Ogden Plant, Container Corporation of America, 900 N. May St., Chicago, Ill.

MILTON J. KITTLER, M. E., is with Chandler-Groves Co., 5980 Vancouver Ave., Detroit, Mich., and resides at 19145 Woodingham Dr.

GEORGE F. KLEINHANS, Arch., resides at 552 Oakdale Ave., Chicago.

CHARLES RAYMOND KUGLIN, E. E., 6948 Eberhart Ave., Chicago, is with M. G. Harbula & Associates, consulting air conditioning engineers, Wheaton, Ill.

VINCENT FRANK LA PIANA, Ch. E., inspector in charge of the Detroit Station of the U. S. Food and Drug Administration, 908 Federal Bldg., Detroit.

HARRY C. NISSEN, C. E., is with Chance-Vought Aircraft Corp., East Hartford, Conn., and resides on Tryon Rd., S. Glastonbury, Conn.

VERNON A. PETERSON, E. E., is a patent attorney with the firm, Langner, Parry, Card, and Langner, 53 W. Jackson Blvd., Chicago, and resides at 7310 N. Paulina St., Chicago. Peterson is the proud father of a baby boy, Thomas Franklin.

HERMAN B. SCHEIDEMANTEL, Ch. E., is with the Brunswick Balke Collander Co., Muskegon, Mich., and resides at 2976 Lake Shore Drive, same city.

ELMER J. SHERMAN, F. P. E., left the Ohio Inspection Bureau on Oct. 1, 1936, to accept a position as production engineer with A. W. Shell & Co., Insurance Agents, 1002 Mercantile Library Bldg., Cincinnati, Ohio.

RAYMOND F. STELLAR, C. E., 6732 Oglesby Ave., Chicago, is in the U. S. Engineers Office, 932 U. S. Post Office Bldg., Chicago. "*A European trip in 1934 and not a day's vacation since then. Therefore, I am restless now, and a trip to Panama at least is brewing.*"

HOWARD S. STOKES, E. E., 125 N. Jackson St., Arlington, Va., is associate radio engineer, Bureau of Air Commerce, Washington, D. C.

JOHN ROLLAND YOUNT, Ch. E., is with the Bakelite Corp., Bound Brook, New Jersey, and resides at 759 Park Ave., same city.

MISSING:
Craig, Chas. C., C. E.
Farrell, Fredk. B. C.E.
Libanoff, Leo, C. E.
Montgomery, G.M., C.E.
Rohr, E. K., F. P. E.
DECEASED:
Greene, W. B., F. P. E.

1930

ERNEST W. BERG, Arch., resides at 2517 N. Sawyer Ave., Chicago.

FRANKLIN EDGAR CHRISTENSEN, Arch., is with the U. S. Dept. of Labor—Immigration and Naturalization Service, Ellis Island, New York Harbor, and resides at 5 W. 63rd St., New York City.

MARVIN R. DOBBERMAN, Arch., is teaching in the Department of Architecture at the University of Illinois, Urbana, Ill.

WILBERT B. DEERING, M. E., 6025 N. Marmora Ave., Chicago, is teaching mechanical and freehand drawing at Lane Technical High School, Chicago.

GUSTAVE G. ERLAND, M. E., 3812 Pine Grove Ave., Chicago, is with Rasmussen and Brugman, Patent Attorneys, 208 S. LaSalle St., Chicago.

EVERETT GOLDEN (GOLDENBERG), Arch., is practicing architecture at 6828 Lakewood Ave., Chicago, and resides at the same address.

ALLEN C. HAEGELE, F. P. E., is with the Federal Hardware & Implement Mutuals, 1411 Kerby Bldg., Dallas, Tex. Haegele has no permanent home address as he is traveling practically all the time. We hope the back number of the *Engineer and Alumnus* reached you at Clinton, Okla.

ABRAHAM KUKLIN, Arch., 3741 Sunnyside Ave., Chicago, is in the real estate department of the First National Bank, 33 S. Clark St., Chicago.

JULIUS LICHENSTEIN, Ch. E., resides at 3624½ Lake Park Ave., Chicago, and would appreciate information about an opening in the chemical field.

WILLIAM R. MANSKE, C. E., is teaching in the Bloom Township High School, and resides at 1415 Campbell Ave., Chicago Heights, Ill. We appreciate your help and glad you are enjoying the *Engineer and Alumnus.*

CHARLES L. RAMBOLT, M. E., 616 Belden Ave., is in the industrial engineering department of Carnegie-Illinois-Steel, South Chicago, Ill.

RAYMOND A. SHOAN, Ch. E., 3815 S. Kenilworth Ave., Berwyn, Ill., is chemist at the Dearborn Chemical Co., 1029 W. 35th St., Chicago.

HAROLD A. WAHLSTRAND, E. E., 7762 Sunset Dr., Elmwood Park, Ill., is a development engineer for the Teletype Corp., 1400 Wrightwood Ave., Chicago.

ROBERT R. WILLIAMS, C. E., 1040 Pennsylvania St., Denver, Colo., is in the U. S. Dept. of Interior, Bureau of Reclamation, Room 440, Custom House, Denver.

FREDERICK E. WILLIAMSON, E. E., 552 Arlington Pl., Chicago, is a sales engineer for Webster Electric Co., Racine, Wis.

MISSING:
Fischman, L. H., C. E.
Frost, A. J., M. E.
Goldman, J. R., Ch. E.
Kilbourne, R.E., F.P.E.
Peterson, F. B., E. E.
Sanborn, F. E., E. E.
Solstad, E. W., Arch.
Taylor, J. L., E. E.
Tell, F. O., Arch.
Wood, M. B., C. E.
DECEASED:
Kara, Jas. J., C. E.
Van Valzah, W.S., M.E.

1931

RALPH J. ABRAMSON, E. E., resides at 1226 S. Harding Ave., Chicago. He is with Max Miller, Plumbers, 4246 W. Fullerton Ave., Chicago.

LEONARD H. DICKE, C. E., is assistant engineer, U. S. Engineer, War Dept., 615 Commerce Bldg., St. Paul, Minn., and resides at 506 Mt. Curve Bldg., St. Paul.

THOMAS W. DOANE, Arch., 3941 Pine Grove Ave., Chicago, is with B. W. Handler Construction Co., 638 S. Clark St., Chicago.

DONALD M. FETTERMAN, E. E., is with the Continental Radio and Television Corp., 618 W. Elm St., Chicago, and lives at 644 York Pl., Chicago.

SADO CARL FICARRATTO, C. E., is in the U. S. Engineer Office, War Dept., Rock Island, Ill. Residence address is 2143 Ainslie St., Chicago.

CHARLES J. GRIFFIN, E. E., is employed at the Bowen High School Branch of the Chicago Board of Education, 9258 Houston Ave., Chicago, and lives at 8236 Loomis Blvd.

HOWARD S. HENDRICKS, F. P. E., is with the Tennessee Inspection Bureau, 420 Stahlman Bldg., Nashville, Tenn. We learned indirectly that he married Miss Jean Hayes of Maywood, Ill., on Oct. 28, 1935. Congratulations!

ELMER T. HOLM, Arch., 5526 N. Campbell Ave., Chicago, is with Sears Roebuck & Co., Homan and Arthington, Chicago.

FRANK M. JAMES, F. P. E., is an inspector for the Kentucky Actuarial Bureau in the branch office at Paducah, Ky. James resides at 1721 Jefferson St., Paducah, and reports the arrival of a daughter, Sandra Caroline, on Nov. 9, 1936.

A. E. FREDERICK JOHNSON, M. E., 5751 S. Richmond St., Chicago. He is with the Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.

PHILIP J. JORDAN, C. E., 7545 Cornell Ave., Chicago, is with the State of Illinois, Department of Public Works and Buildings, Division of Architecture and Engineering, 160 N. LaSalle St., Chicago. Jordan was married to Miss May McGuan of Chicago last January.

HAROLD J. LATHAM, Ch. E., is with the Peoples Gas Light and Coke Co., Chicago, and lives at 1636 Thorndale Ave.

WALTER H. LARSON, Arch., Manchester, Vermont, paid us a short visit in December.

HOMER Z. MARTIN, Ch. E., is an instructor in Chemical Engineering, University of Virginia, Charlottesville, Va.

ORLANDO R. MURPHY, E. E., formerly with the Standard Transformer Co. of Chicago, has recently accepted a position as chief engineer for Robertson-Davis Co., Inc., now operated by James W. Doyle, Inc., engineers and manufacturers of all types of electrical windings and transformers, at 311 N. Desplaines St., Chicago.

MILAN J. MORGAN, Ch. E., 304½ E. Third St., Beardstown, Ill., is with the U. S. Engineer, Field Office, New LaGrange Lock and Dam, Beardstown, Ill.

RAYMOND F. NELSON, Arch., 4136 Cornelia Ave., Chicago, is with the Continental Insurance Co., 844 Rush St., Chicago.

MICHAEL M. SADLAK, M. E., is with the Interlake Iron Corp., 108th St. and Calumet River, Chicago, and lives at 10538 Ewing Ave..

TOD J. STEWART (WLEKLINSKI), Ch. E., 630 N. Stone Ave., LaGrange, Ill., is with the Borden Co., 221 N. LaSalle St., Chicago.

HUNTINGTON R. SCHLAGEL, Arch., is the owner of The Rand Marine, 1435 Jefferson St., Des Plaines, Ill.

FRANK W. SPALDING, JR., F. P. E., is an inspector for the Illinois Inspection Bureau, Jefferson Bldg., Peoria, Ill. Residence, 206 Peoria Ave., Peoria, Ill.

RICHARD H. STEVENSON, M. E., 604 S. Euclid Ave., Oak Park, Ill., is with the Power Plant Specialty Co., 440 S. Dearborn St., Chicago.

LEO STREICHER, Ch. E., is with the Metropolitan Water District of S. California, Los Angeles, Calif. Streicher married Miss Cerna Goldstein of Los Angeles, Calif., on Feb. 21, 1937.

CLAUDE MASON WESTERMAN, F. P. E., is field representative for Lansing B. Warner, Inc., for Northern Ohio since the first of the year. Residence, 11920 Carlton Rd., Cleveland Heights, Ohio. Westerman reports that he sees quite a number of the Armour Tech men in traveling about and enjoys visiting with them.

MISSING:
Blahna, Chas., E. E.
Cherney, N. (Czernecki), M.E.
Crow, Ralph M., Arch.
Dodson, Chas. E., Arch.
Lopatowski, E. J., C.E.
Miles, Wallace, Arch.
Myers, K. H., E. E.
Yzaguirre, M. A., Ch.E.

DECEASED:
None.

1932

FREDERIC S. BEALE., E. E., with the Idaho Power Co., American Falls, Idaho, writes us as follows:

Gentlemen:

May I take time out to tell you that although when first the change was made in the management and form of the "Armour Engineer" I definitely did not like it. Very likely this was due to my prejudice in favor of the thing which I had learned to expect. When the last copy arrived a few days ago, I found I was quite anxious to get it out of its wrapper and see what there was in it.

I enjoy reading about the developments taking place in the school more than anything else—even . . . the alumni notes; and they do interest me, too, because every once in a while I find the name of someone with whom I am acquainted. You see, I have not yet, out here, met any graduates of Armour, so I get no opportunities to reminisce.

I am keeping the information card enclosed in this last issue for future use: I don't expect to stay at this address forever! Oh—I won $100 first prize money for a full automatic a.c. power plant in a national contest conducted by Autopower, Inc., 408 S. Hoyne Ave., Chicago.

Very truly,

MAX BERGER, Ch. E., is at present on a journey on the West Coast of Africa between Liberia and Alpiers. He spent one year in Soviet Russia studying their engineering methods, particularly in the industrial district of Dnieproistrol.

RUSSELL HENRY BLOM, Ch. E., is with the S. W. Shattuck Chemical Co., 1805 S. Bannock St., Denver, Colo. He married Miss Thelma Wright of Waukegan, Ill., on May 10, 1936, and they reside at 1957 S. Logan St., Denver, Colo.

ALEXANDER BOGOT, M. E., is with the Marnis Oil Co., 261 Exterior St., Bronx, N. Y. He is married and lives at 3950 Bronx Blvd., Bronx, N. Y.

DONALD G. BRAUN, Arch., 2055 Park Road, N. W., Washington, D. C., is an architect and heating engineer, Resettlement Administration, 2020 Massachusetts Ave., N. W., Washington, D. C.

JAMES J. CASEY, C. E., is with the Division of Highways, State of Illinois, Elgin, Ill. Residence, Butterfield Rd., Libertyville, Ill.

JAMES M. CLUCAS, M. E., is with the Pomona Pump Co., 4301 S. Spring Ave., St. Louis, Mo. We quote from a recent letter:

Gentlemen:

The Pomona Pump Co., located in Pomona, California, decided on opening a new plant in St. Louis on January 1st, 1937. Last August, I was offered a position with the company at the new plant, accepted, and then spent last September, October, November and December at their factory in Pomona, California in a course of instruction. I am in the office of the Pomona Pump Co., handling interstate sales correspondence, and like the work very much.

I enjoy each copy of the Armour Engineer, and wish you continued success with your pages on news items of Armour Alumni.

Sincerely,

WILLIAM DICKEY, E. E., 811 Lawrence Ave., Chicago, is with the Economy Electric Mfg. Co., 4634 W. 21st Pl., Cicero, Ill.

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Chicago

DONALD E. FREER, F. P. E., is with the Kentucky Actuarial Bureau, 4 Adams Bldg., Covington, Ky., and lives at 75 Henry Ave., Fort Thomas, Ky.

WILLIAM HOLLAND, Ch. E., resides at 45-08 40th St., Long Island City, N. Y.

CHARLES J. JENS, F. P. E., is engineer for Leedoin, O'Connor, Noyes Co., 825 N. Jefferson St., Milwaukee, and resides at 633 N. 4th St.

ALBERT ARTHUR KOCH, C. E., resides at 1375 E. Orange Grove Ave., Pasadena, Calif. He is a senior engineering Aide, U. S. Engineer Office, Los Angeles, Calif.

WALTER E. NORDELL, F. P. E., is with the Fire Underwriter's Inspection Bureau, 1229 Plymouth Bldg., Minneapolis, Minn., and resides at 4507 Chowen Ave., S.

MORRIS POE, Arch., resides at 4646 Magnolia Ave., Chicago. He is architect for the Essaness Theatres Corp., 540 N. Michigan Ave.

RAY W. POETZL, E. E., 1171 S. Cuyler Ave., Chicago, is with the Stewart-Warner Corp., 1826 Diversey Parkway, Chicago.

HARRY C. SETTERBURG, C. E., announces the arrival of a son, Robert Harry, on January 24, 1937. He (not the son), is with the U. S. Engineer Office, 615 Commerce Bldg., St. Paul, Minn., and resides at 1853 Randolph St.

FRANK H. SHEAR, M. E., is a safety engineer for the Liberty Mutual Insurance Co., 230 E. Ohio St., Chicago. Residence, 9053 Ellis Ave.

HOWARD TONSAGER, Arch., is at present preparing his M. S. thesis at M. I. T. Home address, 504 Roosevelt St., Kewanee, Ill.

ARTHUR R. VIEL, Ch. E., is with the Victor Mfg. and Gasket Co., 5750 Roosevelt Rd., Chicago, and lives at 3829 W. End Ave.

CLARENCE H. ZACHER, C. E., 2506 W. Grove St., Blue Island, Ill., is with the Works Progress Administration, Merchandise Mart, Chicago, Ill.

MISSING:
Fox, Chas. H., C. E.
Frye, Paul H., E. E.
Hawes, Chas. S., M. E.
Hromada, F. M., C. E.
Jungels, A. J., M. E.
Stahm, Eli B., Arch.
Toopeekoff, E., M. E.
Wierzbowski, A.E., C.E.

DECEASED:
None.

1933

LE ROY S. ANDERSON, F. P. E., 6810 Plateau St., St Louis, Mo., is with the Missouri Inspection Bureau, 1330 Pierce Bldg., St. Louis.

ORVILLE T. BARNETT, Ch. E., resides at 613 N. W. 28th St., Oklahoma City, Okla., and he is metallurgist for Black, Sivalls, and Bryson Co., Oklahoma City. His work consists of welding, research, and control, with radiography playing an important part in the manufacture of all kinds of pressure vessels. *"My best regards to all the faculty and sincere compliments on a fine Armour Engineer and Alumnus."*

WILBER E. BAUMANN, C. E., resides at 1336 Fayette Ave., Springfield, Ill. We are sorry to learn that Baumann is not working because of a long-standing illness. We trust he may soon experience a complete recovery.

WILLIAM G. BOOTH, JR., Ch. E., is with the Union Special Machine Co., 400 N. Franklin St., Chicago. Residence, 2037 W. 111th St., Chicago.

WILLIS GEORGE BUEHNE, M. E., was married in 1933. He is with the Hot Point Co. (Edison General Electrical Appliance Co.), 5600 W. Taylor St., Chicago, and resides at 835 Bradley Pl., Chicago.

FRANK L. BUSH, Arch., 7129 Harvard Ave., Chicago, is senior draftsman for The H. M. Gousha Co., 536 N. Lake Shore Dr., Chicago, map publishers.

HOWARD JAMES CAMERON, C. E., is assistant engineer, Eastern Division, Branch of Engineering, National Park Service, Mammoth Cave, Ky. Residence, 4828 Hadden Ave., Chicago, Ill.

PAUL ARTHUR CARLSTONE, M. E., 7336 Ridge Blvd., Chicago, is with the International Harvester Co., McCormick Works, Blue Island and Oakley Aves., Chicago. *"I divide my time between the tool design department and instructing in the apprentice school. Certainly appreciate the Armour Engineer and Alumnus."*

CARL N. CLANTON, F. P. E., was married Dec. 31, 1933 and is the proud father of a daughter, Joycelyn, who arrived just a few months ago. Clanton is an inspector for the Kansas Inspection Bureau, 701 Jackson St., Topeka, Kas., and lives at 1713 Lincoln St.

MILTON A. COLLICK, E. E., is with the International Business Machines Corp., 131 E. 6th St., Los Angeles, Calif., and at present he is in San Diego for a few months to install equipment for the Consolidated Aircraft Corp.

FRANK A. DUBSKY, Arch., 6154 S. California Ave., Chicago, is with the Foreign Engineering Co., 310 S. Michigan Ave., Chicago.

ELLSWORTH E. EBERTH, E. E., is with the Carnegie-Illinois-Steel Corp., South Chicago, Ill., and resides at 7908 Langley Ave., Chicago.

CHARLES A. EMLING, Arch., lives at 552 W. Oakdale Ave., Chicago.

GEORGE K. HALLEN, E. E., 624 Barry Ave., Chicago, is with the Belden Mfg. Co., 4647 W. Van Buren St., Chicago.

GUS JENSON, JR., Ch. E., is in the engineering department of the American Mutual Liability Insurance Co., 220 N. Michigan Ave., Chicago. Jenson reports he is married, but failed to divulge his home address.

WILLIAM WHITE LANGE, E. E., is development engineer for the G. E. X-Ray Corp., 2012 W. Jackson Blvd., Chicago. Mr. and Mrs. Lange live at 2423 Dakin St., Chicago, and they announced the birth of a daughter, Suzanne Lila, on Dec. 30, 1936.

JOHN R. McLANE, Arch., 717 E. Capitol St., Apt. C., Springfield, Ill., is with the National Park Service, 300½ S. Second St., Springfield.

A. M. McINTYRE, E. E., is in the engineering department of the Illinois Central Railroad, Room 910, Central Station, Chicago, and resides at 9439 St. Lawrence Ave., Chicago.

ALBERT LEE MEYER, F. P. E., is with the Tennessee Inspection Bureau, 1034 Stahlman Bldg., Nashville, Tenn. Meyer married Miss Ruth Vollman of Chicago on May 4, 1935. They reside at 1704 17th Ave., Nashville, and are the proud parents of a son just a few months old.

ROBERT W. MOLINE, Ch. E., is a photo-operator at R. R. Donnelly and Sons, and resides at 7516 Indiana Ave., Chicago.

F. W. PAINE, Ch. E., 225 Lake Ave., Park Ridge, Ill., is with Claude S. Gordon Co., 1524 S. Western Ave., Chicago.

JACK R. PECHMAN, F. P. E., is with the Mountain States Inspection Bureau, 801 Gas and Electric Bldg., Denver, Colo. Residence, 2287 Bellaire St., Denver.

W. C. ROCKHOLT, M. E., is with the Western Electric Co., S. Cicero and W. Cermak Rd., Cicero, Ill., and resides at 1030 S. Grove Ave., Oak Park, Ill.

EARL G. SHAVER, resides at 10946 Normal Ave., Chicago., and he is with Universal Oil Products Co., 310 S. Michigan Ave., Chicago.

LEROY F. SKUBIC, Arch., 5607 S.

Sacramento Ave., Chicago, is a draftsman for Albert F. Heino, 11059 Hale Ave., Chicago.

W. T. SMETHELLS, F. P. E., is with the Michigan Inspection Bureau, 4000 Barlum Tower, Detroit, Mich., and resides at 8760 Goethe St., Detroit.

DONALD SCHWENNESEN, E. E., 4243 N. Damen Ave., Chicago, is with the Chicago Transformer Co., 3501 Addison St., Chicago.

STEPHEN ASHLEY VANDERPOORTEN, F. P. E., 611 Tuscola Ave., Saginaw, Mich., is with the Michigan Inspection Bureau, Board of Commerce Building, Saginaw.

DONALD G. WILSON, E. E., is with the Commonwealth Edison Co., Room 800, 72 W. Adams St., Chicago, and lives at 5234 Dorchester Ave., Chicago. *"Would like to keep up with Tau Beta Pi and Eta Kappa Nu events, both social and otherwise and would appreciate hearing from both organizations."*

MISSING:
Babcock, G. S., E. E.
Belton, Geo. R., M. E.
Burnet, Alan D., C. E.
Hanrahan, Geo., C. E.
Miller, J. H., Ch. E.
Sanchez, Jos. R., E. E.
Tyler, Wm. W., E. E.
DECEASED:
Cole, Abraham, Arch.

1934

JOHN J. BACHNER, Ch. E., 1120 N. Elmwood Ave., Oak Park, Ill., is now located in the sales engineering department of the Chicago Moulded Products Corp., 2149 Walnut St., Chicago.

FREDERIC CLAY BARTLETT, JR., Arch., "Winbrook," Manchester, Vt., is devoting his time to painting (artist) and architecture. He finished remodeling their home and studio last fall and is having his first "one-man show" of paintings in Boston this spring.

ARTHUR J. COHRS, Ch. E., resides at 521 Circle Ave., Forest Park, Ill.

C. A. CUNNINGHAM, F. P. E., 15 N. Truesdale Ave., Youngstown, Ohio, is with the Ohio Inspection Bureau, 409 Home Savings and Loan Bldg., Youngstown.

LOUIS D'ALBA, C. E., 650 W. 47th St., Chicago, Ill., is in the U. S. Engineer Office, Pekin, Ill., and working on the Peoria Lock and Dam.

CARL E. DAHLGREN, M. E., gives the following information on his return card. Home: Stallarholmen, Sweden. Business: Supt. Stallarholmens Industri AB, Strengnes, Sweden.

HAROLD W. A. DAVIDSON, C. E., 2027 Farragut Ave., Chicago, Ill., is with Joseph T. Ryerson and Son, Inc., 16th and Rockwell Sts., Chicago.

RAYMOND L. ELLIS, F. P. E., is with the Missouri Inspection Bureau, 1330 Pierce Bldg., St. Louis, Mo., and resides at 6568 Smiley Ave., St. Louis. Ellis reports he is the proud father of a son, Korman Dorsey.

LAWRENCE FRATESCHI, E. E., 1932 Oakdale Ave., Chicago, Ill., is with the Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago.

HERMAN O. GERHARDT, Arch., is a member of the firm, Koerner and Gerhardt, Archs., 9908 S. Western Ave., Chicago, and resides at 7606 Chappel Ave.

FRANCIS M. GIBIAN, M. E., is with the Douglas Aircraft Co., Santa Monica, Calif., and resides at 1746 Ocean Ave., Santa Monica.

BERNARD N. GIBSON, Arch., reports that he is now a married man and so sorry to leave the rest of the gang in Chicago. He lives at 2444 Virginia St., Berkeley, Calif., and is an estimator and draftsman for the Kawneer Mfg. Co., Berkeley, Calif.

GLENN F. GRAHAM, E. E., is with the Commonwealth Edison Co., 72 W. Adams St., Chicago, and resides at 1167 S. Scoville Ave., Oak Park, Ill.

FRANCIS EDWARD HEADEN, M. E., 546 E. 80th St., Chicago, is service engineer for the Shell Petroleum Corp., 624 S. Michigan Ave., Chicago.

THEODORE H. IRION, Arch., is with Auler-Jensen and Brown, Archs., E. R. A. Bldg., Oshkosh, Wis. Irion married Hildegarde M. Wetzeler, of Appleton, Wis., on Oct. 1, 1936 and they are now living in a home which he designed and built last summer at 204 Evans St., Oshkosh.

DONALD L. JACOBSON, F. P. E., 845 S. Corona St., Denver, Colo., is with the Mountain States Inspection Bureau, 801 Gas and Electric Bldg., Denver. Jacobsen married Ruth Ione Connahan on June 9th, 1934, and they are the happy parents of a son, Roger Kenneth, born July 26, 1936.

GEORGE KORINK, C. E., resides at 1863 Wyoming Ave., N. W., Washington, D. C., and he is with the U. S. Gypsum Co.

STEPHEN G. LEHMANN, E. E., is with the Illinois Bell Telephone Co., 6045 Kenwood Ave., Chicago, Ill., and lives at 8334 Indiana Ave., Chicago.

ROBERT J. LODESKI, C. E., 212 S. Harvey Ave., Oak Park, Ill., is field engineer for the Wisconsin Steel Works, 106th and Torrence, South Chicago, Ill.

JOHN B. LUKEY, M. E., 396 Uvedale Rd., Riverside, Ill., is with the Ingersoll Milling Machine Co., Rockford, Ill. Sorry he had to cancel his trip to Japan because of a transfer in position. We hope the new job proves entirely satisfactory.

LEO J. McDONALD, M. E., is with the Multi Electrical Mfg. Co., 1840 W. 14th St., Chicago, Ill., manufacturers of lighting fixtures. He resides at 314 S. Humphrey Ave., Oak Park, Ill.

VLADIMIR J. NOVAK, Arch., resides at 2527 S. Ridgeland Ave., Berwyn, Ill. He is an architect for the Better Housing Corp., 33 N. LaSalle St., Chicago.

BERTHIL HENRY PETERSON, F. P. E., 5721 S. Ada St., Chicago, Ill., is with the Michigan Inspection Bureau, Union National Bank Bldg., Marquette, Mich. *"Was transferred from the Detroit office in March, 1935 to the upper peninsula office at Marquette. Worked all over the upper peninsula and am at present (January) working on a re-rating program at Escanaba, Mich. Am single, but for how long no one knows. Alumni welcome—come up and see me sometime."*

ARNOLD J. PFEILER, C. E., is an engineer for Jerry Donahue Engineering Co., consulting engineers, 608 N. 8th St., Sheboygan, Wis. Residence, 1810 N. 5th St.

WILBERT E. RICHARDSON, E. E., is with Crane and Co., 41st St. and Kedzie Ave., Chicago, Ill., and lives at 5052 Nelson St.

WILLIAM G. SCHARING, C. E., 6701 W. Diversey Ave., Chicago, is with the Minneapolis Honeywell Regulator Co., 43 E. Ohio St., Chicago, Ill.

WILLIS E. ROBINETTE, F. P. E., formerly with the Oklahoma Inspection Bureau, married Miss Myrle Wooten of Oklahoma City on December 27, 1936. Our best wishes for many years of health and happiness. Their present address is 313 Eastern Parkway, Louisville, Ky.

EARLE H. SHAW, F. P. E., is with the Fire Underwriter's Inspection Bureau, 1229 Plymouth Bldg., Minneapolis, Minn., as a full-fledged inspector covering the states of Minnesota, North and South Dakota. Shaw married Miss Virginia Francis Dimond of Chicago on July 9th, 1936. They reside at 2400 Harriet Ave., S., Apt. 309, Minneapolis.

ROBERT W. SUMAN, M. E., is at the Caldwell-Moore Plant of the Link-Belt Co., 2410 W. 18th St., Chicago. Suman

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presented a paper at the Junior Section Meeting of the Western Society of Engineers, March 19, 1936, entitled, "The Ice Slinger and Its Contribution to Long Distance Movement of Perishables," which was later voted the Charles Ellet Award. We quote herewith from a print of the notice and conditions of this award:

"*THE AWARD*

"The Award shall be known as the Charles Ellet Award, since his life and its accomplishments are a vivid example of a younger engineer whose undaunted determination to succeed in the face of overwhelming disappointments outlived the struggle for recognition.

"The Award is symbolized by a loving cup, bearing the inscription of the Western Society, on which shall be engraved the name and schools of the recipients. The award will be kept in the lounge rooom of the Western Society. A suitable certificate signed by the Chairman of the Junior Engineers and the Secretary of the Society will be given the recipient.

"*ELECTION*

"The award shall be presented each year to a Junior member of the Western Society for excellence in the preparation and presentation of a technical paper before the Junior Engineers. The ability to prepare a comprehensive engineering report is a primary requisite of the engineer of today. The ability to address his associates in public meeting, while not essential, is nevertheless, desirable. Often technical ability passes unrecognized for want of suitable expression.

The recipient shall be elected by a committee consisting of the Secretary of the Western Society, the Chairman of the Junior Engineers, the Junior Sponsor, and three Junior Engineers not eligible to receive the award appointed by the Chairman and approved by the Secretary. The reports as presented at the weekly meetings of the Junior Engineers shall be written in the final form one week after presentation for publication in the Journal of the Western Society. The selection of the recipients shall be based on these publications."

PAUL JAMES THOMPSON, E. E., is an industrial engineer with Montgomery Ward & Co., 150 N. Broadway, Albany, N. Y., and lives at 95 N. Allen St., Albany. Thompson is still 'foot loose and fancy free.'

MISSING:	DECEASED:
Eberly, Kenneth, Ch.E. Morelli, A. J., Arch.	Hanes, Geo. A., M. E.

1935

JOHN J. AHERN, F. P. E., 14271 Strathmoor, Detroit, Mich., is with the Michigan Inspection Bureau, 4000 Barlum Tower, Detroit.

ALFRED AUGE, E. E., is a draftsman for McConkey and Booth, 2818 Bankers Bldg., Chicago, and lives at 2119 Osgood St. Auge informs us that he recently announced his engagement to Miss Thelma Williams.

EDWARD G. AVERY, M. E., 219 S. Cuyler Ave., Oak Park, Ill., is with the National Korectaire Co., 1619 Cortland St., Chicago.

HOWARD T. BOLTON, C. E., is a Junior Engineer, War Dept., U. S. Engineer Office, Rock Island, Ill., and lives at 1707 Bridge Ave., Davenport, Iowa.

L. W. DAVIDSON, Arch., 6921 Perry Ave., Chicago, is in the engineering department of the American Can Co., 104 S. Michigan Ave., Chicago.

THEODORE G. DELANG, Ch. E., is with the Featheredge Rubber Co., 340 W. Huron St., Chicago, and resides at 1501 Forest Ave., Wilmette, Ill.

ROBERT E. ESBENSEN, Arch., 2127 N. LeClaire Ave., Chicago, is with the Hooker Glass and Paint Mfg. Co., 659 W. Washington Blvd., Chicago, Ill.

RICHARD L. FRIEDE, E. E., 3409 Parnell Ave., Chicago, is in the U. S. Navy at U. S. Naval Air Station, Pensacola, Fla.

STEWART S. GRANGER, Arch., 10140 S. Rhodes Ave., Chicago, is with W. F. McCaughey, Arch., 3 S. Prospect Ave., Park Ridge, Ill.

CLIFFORD H. HOOT, Ch. E., 3832 N. Irving Ave., Chicago, is chemist for E. C. Mullen Co., 2525 W. 21st St., Chicago.

LESTER O. A. JOHNSON, Arch., 7544 Sangamon St., Chicago, is attending Yale University for a Masters Degree in Architure, School address, c/o Weir Hall, Yale University, New Haven, Conn.

J. RUSSELL LANG, Ch. E., is with the Lindberg Steel Treating Co., 224 N. Laflin St., Chicago, and lives at 2229 Eastwood Ave., Chicago.

HENRY LEON MAYEROWICZ, M. E., 3443 Prairie Ave., Brookfield, Ill., is with Roy M. Moffitt & Co., 13234 Sheffield Ave., Chicago, specialists in air conditioning.

GEORGE A. NELSON, C. E., Y. M. C. A., Box 57, Vicksburg, Miss., is Civil Engineer Aid, U. S. Waterways Experimental Station, Vicksburg, Miss. The following letter was recently received from Nelson and were glad to pass it on:

"Just a word of alumni news—a bit late, perhaps, but better late than never. Briefly, the "news" is this. During the holidays I was in Chicago and took advantage of the opportunity to contact my classmates. There was a reunion of the 1935 class of Civil Engineers at my home on Dec. 29, 1936. All the men in town were contacted—and they turned out 100% for the gathering—the second since graduation. Also present was Prof. Penn. An enjoyable evening was spent discussing the various work being done by different members of the class.

It is noted that all the men of that class are working, and their activities range over a territory stretching from Michigan and Wisconsin to Mississippi. The distance record was set by two men, Nick Maurer and myself—both being stationed at Vicksburg, Mississippi—but Maurer won the all-round championship when he reported the first prospect for the class of 1956—and his name is "Nick, Jr." Others having already forsaken the glorious mantle of bachelorhoood include such die-hards as Kettlestrings and Graham. These are in addition to Bolton and Curran who were ousted from the bachelors' club before graduation. Two others who succumbed (sic) before leap year had run its course, and for whom the wedding bells are soon to ring are Albert Lester and George West. Rumors regarding certain others, principally Stocking and Bernstein, could not be verified, but where there is smoke, there must be fire!

Some idea of how varied are the abilities of the class can be gained from the following information:

Professional activities ranging through structural design, highway work, mechanical design, experimental hydraulics, building construction, engineering sales, sewer design and construction, railroad work, land surveys, air conditioning, steel production, chemistry and drafting were reported. Four men are employed by the federal government, three more by the state of Illinois, and the remainder by private industry.

In closing, I might add that the men of the 1935 Civil Engineering class send *their best wishes to the faculty and to their former classmates.*

TAD OMIECINSKI, Ch. E., 9263 S. Park Ave., Chicago, is in the Department of Inspection, Open Hearth Laboratory, Wisconsin Steel Works, 10600 Torrence Ave., Chicago.

CHARLES H. RADVILLAS, M. E., resides at 507 Smithville Rd., Dayton, Ohio. He is Junior Mechanical Engineer with the Army Air Corp at Wright Field, Dayton, testing airplane engines.

GEORGE L. ROSENTHAL, Ch. E., 2865 Dickens Ave., Chicago, is with the Universal Scientific Equipment Co., 1210 W. Van Buren St., Chicago, in charge of the design of corrosion proof equipment.

CHARLES D. THOMSEN, C. E., is with Greeley and Hansen, Hydraulic and Sanitary Engineers, 6 N. Michigan Ave., Chicago, Ill. Residence, 7429 Maryland Ave., Chicago.

WILLIAM A. TRUDELLE, F. P. E., resides at 1442 E. Marquette Rd., Chicago. He is with the Insurance Co. of North America, 209 W. Jackson Blvd., Chicago.

ARLINGTON M. WOLF, E. E., is with Cutler-Hammer, Inc., 2755 E. Grand Blvd., Detroit, and lives at 10100 Harper Ave., Detroit.

H. R. YOUNGKRANTZ, Ch. E., 7643 Normal Ave., Chicago, is metallurgist for the Apex Smelting Co., 2554 Fillmore St., Chicago.

HOWARD J. ZIBBLE, F. P. E., 1225 Washington Ave., Wilmette, Ill., is now with the Willett E. Main Insurance Agency, Tenney Block, 110 E. Main St., Madison, Wis. Thanks, Zibble, for the 15A—Armour Engr—7480 3-1 (8 *Wheeler* information as to location of Armour Tech men in your recent letter.

CHESTER M. ZUKOWSKI, Arch., is designer and delineator for the Servicised Products Corp., 6059 W. 65th St., Chicago, and lives at 5153 S. Laflin St., Chicago.

MISSING:	DECEASED:
None.	None.

1936

EMIL ADAMEC, Ch. E., 7637 62nd Pl., Argo, Ill., is with the Corn Products Refining Co., Argo, Ill.

JACK ALLEN, Arch., 2132 Milwaukee Ave., Chicago, is an architectural draftsman for the Historic American Buildings Survey, 34 E. Wacker Dr., Chicago.

HERBERT STANLEY ARNOLD, E. E., is with the Western Electric Co., S. Cicero Ave., and W. Cermak Rd., Chicago. Home address, 7317 Stewart Ave., Chicago.

MILTON J. BEJCEK, Arch., 1829 S. 59 Court, Cicero, Ill., is an engineering draftsman for the Chicago Park District. Administration Building, Burnham Park, Chicago.

CARLO M. CHRISTENSEN, M. E., 6337 N. Clark St., Chicago, is with the Gatke Corp., 228 N. LaSalle St., Chicago, and says, *"doing a little drafting, designing, quoting prices, corresponding, and general engineering work."*

FRANK D. COTTERMAN, M. E., 4716 N. Hermitage Ave., Chicago, is with the Crane Co., 4100 S. Kedzie Ave., Chicago.

WALTER M. DOMBROWSKI, C. E., 4015 Brighton Pl., Chicago, is with the Division of Highways, State of Illinois, 126 E. Ash St., Springfield, Ill.

ARTHUR J. DUERRSTEIN, C. E., 413 Addison Ave., Elmhurst, Ill., is with the Universal Oil Products Co., 310 S. Michigan Blvd., Chicago.

FRANK H. GALLAGHER, M. E., 4614 Irving Park Blvd., Chicago, is with the Peerless Ice Machine Co., 515 W. 35th St., Chicago.

WILLIAM S. GRAY, Ch. E., 215 S. Harvey Ave., Oak Park, Ill., is with the Chicago District Pipe Line Co., R. F. D., Joliet, Ill.

ARTHUR J. HAEGER, E. E., 1024 N. Central Park Ave., Chicago, is with the Grarbay Electric Co., Inc., Minneapolis, Minn.

DON CARLOS HARRIS, M. E., 6238 St. Lawrence Ave., Chicago, is with the Carbide and Carbon Chemicals Corp., Box 750, Whiting, Ind.

IRBY MURREY HUGHES, F. P. E., is an inspector with the Oklahoma Inspection Bureau, 801 Mercantile Bldg., Oklahoma City, Okla. He lives at 531 N. E. 8th St., Oklahoma City .

GEORGE F. HAGENAUER, JR., Ch. E., 7932 Langley Ave., Chicago, is with the Carnegie-Illinois Steel Co., South Works, 89th St. and the Strand, Chicago. Hagenauer informs us that he took a 1,500 mile bicycle trip through Europe, covering ten countries last summer. We hope to hear some details on the trip later.

T. M. HOFFMAN, JR., E. E., 7146 Normal Blvd., Chicago, is with the Belden Mfg. Co., 4647 W. Van Buren St., Chicago.

JOHN HAROLD JOHNSON, Ch. E., reports that he is working in the research and development department of the Standard Oil Co., of La., at Baton Rouge, La. Lives at 418 Hypolite St., Baton Rouge.

LINUS LEO KNITTEL, F. P. E., 5727 W. Huron St., Chicago, is with the Ohio Inspection Bureau, 431 E. Broad St., Columbus, O. Knittel reported in January that he and Donald J. Neal, F. P. E., '36, were working together in Steubenville, O.

ALBERT E. KRAUS. E. E., 3750 Lake Shore Dr., Chicago, is selling for the Champion Spark Plug Co., Toledo. A card from Kraus the last of December stated: *"Am in Denver on way to coast in my Ford and doing fine as sales engineer. Will travel over entire west coast."*

EARL A. KREFT, Ch. E., 632 Harrison St., Oak Park, Ill., is with Wilson & Co., Inc., 42nd St. and S. Ashland Ave., Chicago.

ANTHONY S. MAJERCIK, M. E., is with the Illinois Tool Works, 2501 N. Keeler Ave., Chicago. Home address is 6019 N. Mason Ave.

ALEX J. McALLISTER, M. E., 611 E. 90th Pl., Chicago, is with the S. L. Refrigerating Co., 1834 W. 59th St., Chicago.

HARRY S. NACHMAN, M. E., is now with the Kroeschell Engineering Co., air conditioning contractors, 215 W. Ontario St., Chicago.

VINCENT G. NELSON, Ch. E., is with the Allegheny Steel Co., Brackenridge, Pa., and lives at 908 Corbet St., Farentum, Pa.

CURTIS H. PARSON, M. E., 6301 Lakewood Ave., Chicago, is with the Danly Machine Specialties Co., 2104 S. 52nd Ave., Cicero, Ill.

RAYMOND A. PETERSON, F. P. E., 1534 N. Leavitt St., Chicago, is with the Kentucky Actuarial Bureau, 940 Starks Bldg., Louisville, Ky. Peterson paid us a call a few weeks ago while he was on a forced vacation as a result of the recent flood in the Ohio River Valley.

JOSEPH PFENDT, Arch., 2258 N. Avers Ave., Chicago, is with H. A. Brand, Arch., 400 W. Madison, and at present he is superintending the construction of a church near St. Louis, Mo.

GEORGE A. QUANDEE, F.P.E., 8800 S. Wood St., Chicago, is with the Ohio Inspection Bureau, 431 E. Broad St., Columbus, Ohio.

ROBERT B. RICHARDS, C. E., 6415 Drexel Ave., Chicago, is with Charles DeLeuw and Co., Rm. 1812, 20 N. Wacker

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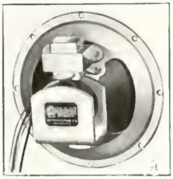

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ALBERT A. ROOTBERG, C. E., 5557 W. Jackson Blvd., Chicago, is with the Division of Highways, State of Illinois, 35 E. Wacker Dr., Chicago.

A letter from CARLOS D. RODRIGUEZ, Ch. E., brings the information that he is employed in the laboratory of a petroleum company and that he is spending all of his spare time trying to get into working order, a plant which he and his brother own for the distillation of pine resin. Rodriguez may be reached by addressing mail to him in care of his brother's firm as follows: c/o Radio Industrial, S. de R. L., Republic Del Salvador, Num 46, Mexico, D. F.

ROBERT P. SAMUELS, Arch., is with Chas. S. Dilbeck, Arch., 122 Allen Bldg., Dallas, Tex. Samuels married Miss Helen Adkins of Chicago on December 29th, 1936, and they reside at 4931 Bryan, Dallas. We extend our congratulations and best wishes.

MAURICE P. SHIU, E. E., married Miss Georgianna Lei Wan in Canton, China, on December 23rd, 1936. Address: 13 May Yee Kong, Tung Shon, Canton, China. Congratulations from the Alumni.

ROBERT SIMONS, E. E., 1216 S. Homan Ave., Chicago, is with the Galvin Mfg. Corp., 847 W. Harrison St., Chicago.

HERBERT V. TALLITSCH, C. E., 5710 Wilson Ave., Chicago, is with the Goss Printing Press Mfg. Co., 15th and Paulina St., Chicago: *"Larson, Richards, Linden, Ramotowski, Zwissler, R. R. Johnson, Bergquist, and myself have been enjoying a round of dinners and the theatre."*

Chemalum, the organization formed by the Ch. E. class of 1936, held a reunion at the Allerton Hotel, Saturday, December 26th, 1936. Professor B. B. Freud, the honorary member, and twenty-four of the thirty-four active members were present. Out-of-town men attending were Vincent Nelson, Tarentum, Pa.; Engstrom, Owensboro, Ky.; Ragan, Kalamazoo, Mich.; John Kahles, Cincinnati, Ohio. After an excellent dinner and short snappy business meeting, the members adjourned to Bensinger's for an evening of billiards and bowling. The officers of Chemalum are Tallafuss, president; Siegel, secretary-treasurer; Paulsen, social chairman. Howard P. Milleville, please note Siegel's new address is 1354 Winnemac Ave., Chicago. Your telegram was late.

Congratulations on the continued success of your organization and the spirit of friendship and cooperation which you are displaying.

An enthusiastic reunion was held by twenty electricals, members of the class of 1936, on the 23rd of October 1936, at the Fred Harvey Restaurant in the Union Depot, Chicago. Employment and future meetings were the subjects that received the most attention after a very satisfying dinner. It was decided to get together for dinner and entertainment about every four months. E. J. Kirsch, 2732 N. Talman Ave., Chicago, is chairman of this group, and Rodger Knaus, c/o Y. M. C. A. Hotel, Schenectady, N. Y., is secretary. Knaus is with the G. E. Co., taking the student training course. Both of the men would appreciate word from the members of the class who are out of the city or for other reasons are unable to attend. Please keep the Alumni Office informed about your meetings, and you have our best wishes for success.

MISSING:
None.

DECEASED:
None.

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CHICAGO CHARTER CENTENNIAL

MAY 1937

Armour ENGINEER and Alumnus

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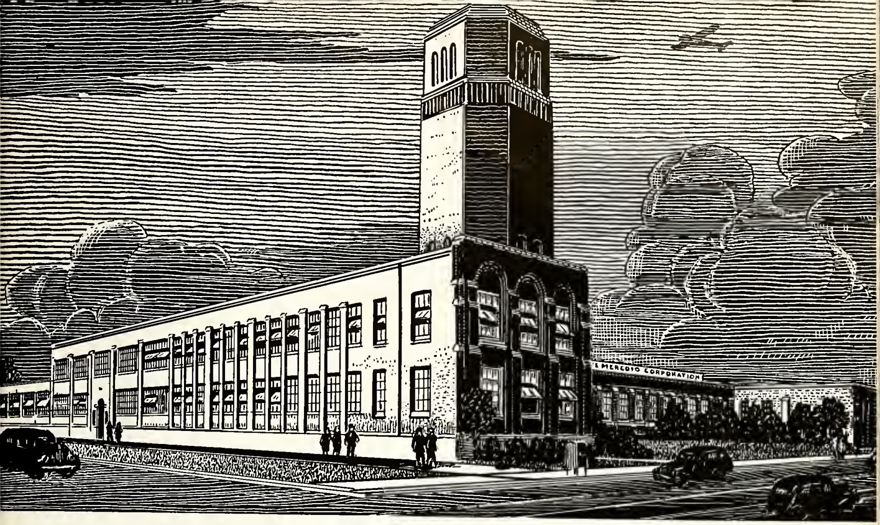

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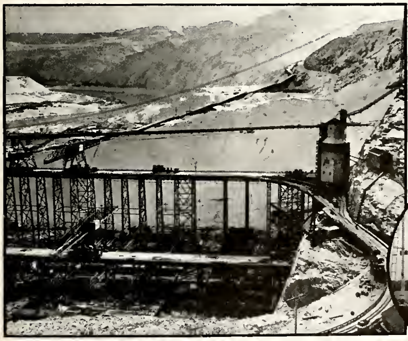

Man's greatest handiwork—the Grand Coulee Dam—is using vast quantities of Crane valves, fittings and piping. Its employe-town, Mason City, is equipped with Crane plumbing.

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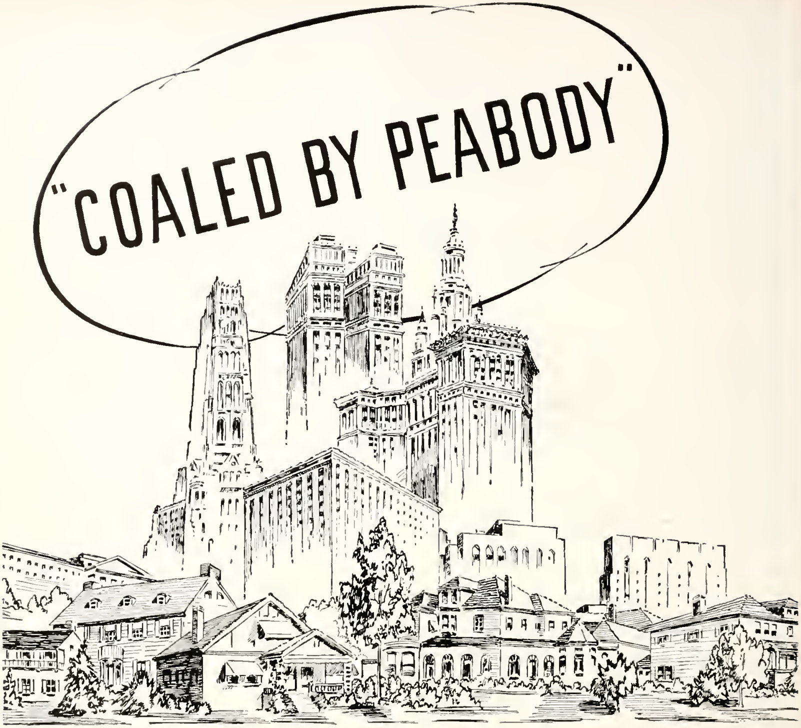

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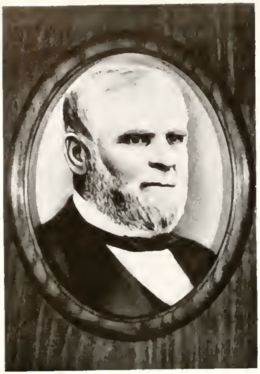

William B. Ogden
First Mayor of Chicago

Edward J. Kelly
Present Mayor of Chicago

OFFICE OF THE MAYOR
CITY OF CHICAGO

EDWARD J. KELLY
MAYOR

April 30, 1937

Armour Engineer and Alumnus
Armour Institute of Technology
Chicago, Illinois

Gentlemen:

This year, 1937, the city of Chicago is celebrating its first One Hundredth Anniversary. Young, as compared with many other cities, it has grown within this century from a frontier post with less than a hundred inhabitants to the second most populous city in the United States and fourth largest in the world.

But Chicago is proud not because of its size, but on account of its achievements. Early in its history it pulled itself out of the mire by its own bootstraps; and a little later, after one of the worst conflagrations in history, undaunted, it built a new city upon the ruins of the old. Today, in the spirit of its motto, "I WILL", it is striving to build a city fairer still, and one commensurate with the ideas and ideals of a new age.

It can boast of many things: of being the railroad center of the world, an industrial center, a great market place, a financial stronghold, the gateway to the West, a natural playground, a center of art and architecture, culture and religion, and an Athens of learning. And it acknowledges that it is because of these things that it is entitled to be numbered among the fairest cities of the earth.

The modern city is a complex machine. It needs for its successful operation, the knowledge, skill, and understanding of a large number of men. These men must be at once practical and imaginative, capable, yet far-seeing. Chicago is fortunate in having such an educational institution as the Armour Institute of Technology, whose graduates have contributed their skill in engineering and architecture; and the Institute is fortunate in being situated in this great center of industry and culture.

Sincerely yours,

Edward J Kelly

Mayor

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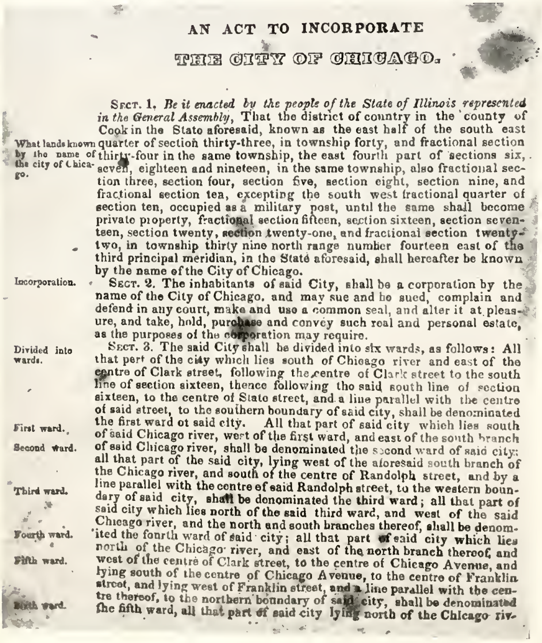
■ *Eugene Stinson* is Music Critic for the *Chicago Daily News,* having filled that same position with the *Journal* up to the time of its consolidation. He is a graduate of Amherst College.

HISTORY *of the City of* CHICAGO

By L. Hubbard Shattuck



AN ACT TO INCORPORATE

THE CITY OF CHICAGO.

What lands known by the name of the city of Chicago.

SECT. 1. *Be it enacted by the people of the State of Illinois represented in the General Assembly*, That the district of country in the county of Cook in the State aforesaid, known as the east half of the south east quarter of section thirty-three, in township forty, and fractional section thirty-four in the same township, the east fourth part of sections six, seven, eighteen and nineteen, in the same township, also fractional section three, section four, section five, section eight, section nine, and fractional section ten, excepting the south west fractional quarter of section ten, occupied as a military post, until the same shall become private property, fractional section fifteen, section sixteen, section seventeen, section twenty, section twenty-one, and fractional section twenty-two, in township thirty nine north range number fourteen east of the third principal meridian, in the State aforesaid, shall hereafter be known by the name of the City of Chicago.

Incorporation.

SECT. 2. The inhabitants of said City, shall be a corporation by the name of the City of Chicago, and may sue and be sued, complain and defend in any court, make and use a common seal, and alter it at pleasure, and take, hold, purchase and convey such real and personal estate, as the purposes of the corporation may require.

Divided into wards. First ward. Second ward. Third ward. Fourth ward. Fifth ward. Sixth ward.

SECT. 3. The said City shall be divided into six wards, as follows: All that part of the city which lies south of Chicago river and east of the centre of Clark street, following the centre of Clark street to the south line of section sixteen, thence following the said south line of section sixteen, to the centre of State street, and a line parallel with the centre of said street, to the southern boundary of said city, shall be denominated the first ward of said city. All that part of said city which lies south of said Chicago river, west of the first ward, and east of the south branch of said Chicago river, shall be denominated the second ward of said city: all that part of the said city, lying west of the aforesaid south branch of the Chicago river, and south of the centre of Randolph street, and by a line parallel with the centre of said Randolph street, to the western boundary of said city, shall be denominated the third ward; all that part of said city which lies north of the said third ward, and west of the said Chicago river, and the north and south branches thereof, shall be denominated the fourth ward of said city; all that part of said city which lies north of the Chicago river, and east of the north branch thereof, and west of the centre of Clark street, to the centre of Chicago Avenue, and lying south of the centre of Chicago Avenue, to the centre of Franklin street, and lying west of Franklin street, and a line parallel with the centre thereof, to the northern boundary of said city, shall be denominated the fifth ward, all that part of said city lying north of the Chicago riv-

Facsimile of First Charter Granted to the City of Chicago, One Hundred Years Ago

IN the beginning—before recorded history began or primitive man set foot on the sandy plain that was to be Chicago, the hand of the Master Builder so fashioned the surface of this continent that all future natural roads should focus on this city of destiny.

The original plan of creation provided a direct water route to the Atlantic with only a short portage to the Gulf and the other America. The rich, fertile plains and the broad valley of the Father of Waters formed the "back country" so necessary for the development of a great metropolis.

When people from New England and New York grew restless and the westward migration began, the great barrier of Lake Michigan separated them from the promised land of fruitful farming country to the West, and the main route for overland travel, from the end of the canal at Buffalo, led through the new settlement. Lake boats touched there also, and this was important, for as early as 1840 there were fifty or sixty steamboats on the Great Lakes, at a time when we were sending only five back and forth to Europe, three from Boston and two from New York.

Grain from nearby fields was the first commodity that was shipped in any volume from the port of Chicago, but soon after the opening of the Illinois and Michigan Canal in 1848, the products of the Gulf States were being brought here by way of the Mississippi, and we were shipping sugar, coffee, and cotton to the East.

There were forests on both sides of Lake Michigan and up in Wisconsin, and when the treeless prairie states began to clamor for building materials, the lumber industry started with a boom—with Chicago as distributing point. Then coal mines were developed in Indiana and Illinois. Then iron ore was discovered in the Lake Superior region, where it could be shipped to Chicago docks, and we began to manufacture pig iron, becoming in a very modest way a rival of Pittsburgh.

Coming of the Railroads

Long before that, however, in spite of the protests of stage line owners and sympathizers, railroads had come to Chicago. An early capitalist, William B. Ogden, put the money he had made by backing Cyrus McCormick and his reaper into building the Galena and Chicago Union Railroad. In 1848, a tender and two shabby cars ran over rerolled iron rails all the way to Desplaines, a settlement ten miles away. Strange as it may seem, our first railroad ran west instead of connecting with the East.

From the start, the new venture was successful, but Ogden had for his objective the lead mines and the river traffic, and he gradually pushed on to the West until by 1858 the line reached Freeport, where arrangements were made with the Illinois

Fort Dearborn in 1803, Showing Indian Agent's House.

Chicago's First Post Office, 1833, at Lake and Market Streets.

Central for use of its tracks into Galena.

In the meantime, roads were coming into Chicago from the East. The first arrived in February, 1852, to be received with frenzied enthusiasm. Six months later, tracks were laid across Illinois to the Mississippi, challenging the supremacy of the river steamboats. After that, railroad building was practically continuous, and within five years there were over a hundred trains going in and out of Chicago every day. Chicago was the new commercial giant of the West—the great central market of the world's richest valley.

The village had become a city by that time, and we had already made our first lake front improvement—a change in the location of the mouth of the river. Now we faced a more serious problem in engineering.

"No Bottom Here"

Chicago had been built in a river bottom and was partly surrounded by swamps. For the greater part of the year, mud was knee deep—a serious disadvantage to early merchants and their business. Trade was practically at a standstill during the spring. Wagons and drays were stalled on Lake Street between Wabash Avenue and the river for weeks on end. People travelled about only with difficulty, and farmers could not get to town. Store clerks whiled away idle hours marking the worst holes "no bottom here" or "the shortest road to China." A board would be nailed across another, stuck upright in the mud, dressed in an old hat and coat, and labelled "on his way to the lower regions." In fact there was no end to the fun.

This wretched condition could not be tolerated forever, and after much deliberation, the city fathers decided upon an experiment in paving which indicated ingenuity but lack of engineering technique. The city was nearly ten feet above lake level at State and Madison Streets, but sloped to six feet on the north and west. The theory was that if the main streets were dug to lake level and planked, surplus water and sewage would settle in the gutters and be carried off.

The Common Council ordered the planking of Lake Street in January, 1849. Paving with stone had proved fruitless as the cobbles sank out of sight in the mud after a year or two. Planked roads had been successful in Canada and New York, and this fact influenced city officials to authorize similar construction. The fact that Chicago stood on porous swampy soil did not enter into their reckonings. The plan of planked streets for Chicago worked to the extent that sewage settled in the gutters and stayed there. The stench from oozing slime and sinking pavements was almost unbearable, but the city kept on planking for two more years. Nearly three miles of this pavement were laid at a cost of $31,000.

Out of the Swamp

Five years of this—and a staggering decision was made. The streets would be filled in and the grade raised some six to eight feet above the natural level. A storm of protest arose, and during the spring of 1857 the excitement was intense. Citizens branded the project as visionary and tried to keep workmen from filling in the low land, by injunction. Lake Street property owners in particular were aroused as the proposed fourteen foot grade would bring their level up some three or four feet.

The *Tribune* of April 9, 1857, fulminated editorially:

"What effect is the new grade to have on buildings already erected in this city? . . . The proposed grade would damage immensely all our citizens who have built those magnificent brick and stone blocks within the past three years. . . . The 'new grade' would throw their floors some four feet below the sidewalks, while the second floors would be five or six feet above the street surface, and their cellars would become dark pits underground. Frame houses could be set up on blocks, while brick ones, such as the Tremont House might be entered from the street through the second story windows, by building two or three short steps upon the proposed sidewalks. . . . Where are millions of cubic yards of earth to come from? . . . How many millions of dollars is it going to cost the taxpayer? . . . Now is the time to speak or forever hold your peace."

As it turned out, citizens never were forced to enter houses by the second story. Chicago's buildings were raised to the new grade on jackscrews. During the process in some places there were four or five sidewalk levels in a single block, and as much time was spent in running up and down short flights of steps connecting the various levels as in going

Wolf's Point, 1832.

John Kinzie House, 1835.

of Chicago Historical Society

Key

First Court House, 1835

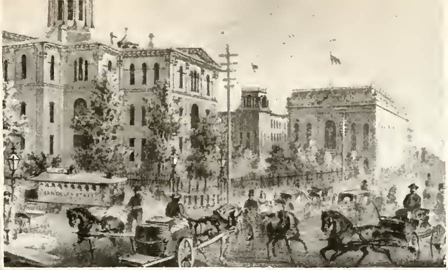
First Shipment of Grain from Chicago, 1839

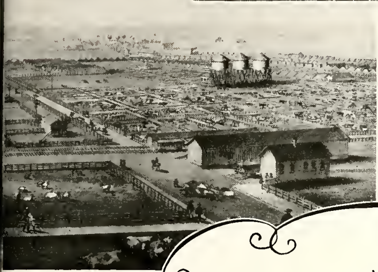
Frink & Walker Stage Office, 1844

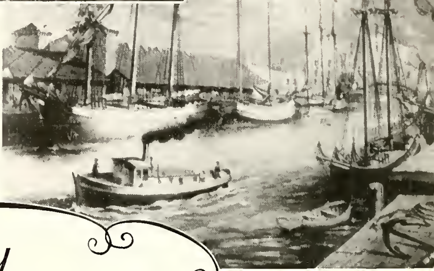
Chicago Tribune, 1851

Chicago in 1853

Wigwam, where Lincoln was Nominated







Key

LaSalle Street north from Randolph. 1865

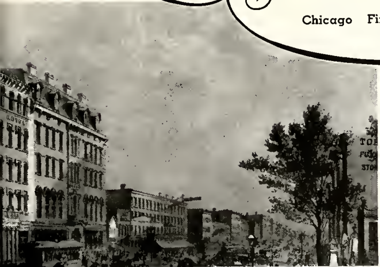
Union Stock Yards. Opened in 1865

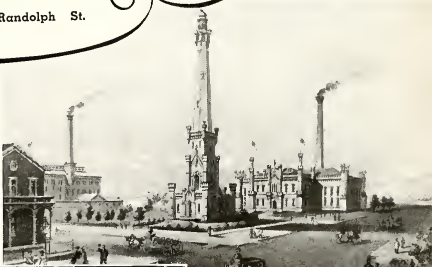
River Scene. North from Adams St., 1865

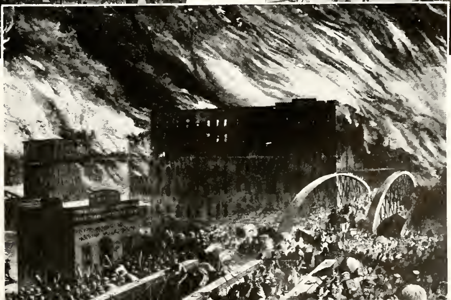
State Street. North from Washington St., 1866

Water Works at Chicago Ave. Completed 1869

Chicago Fire, 1871. Randolph St. Bridge







Typical View of Modern Chicago.

forward. The Tremont House was the first brick building to be raised in Chicago, and many were the prophecies that it would fall down during the endeavor. It was raised, however, without the shattering of a single pane of glass. Shortly after this successful feat, half a block of heavy buildings on Lake Street were raised. It took 5,000 jackscrews and 500 men to do it.

The spectacle of a city lifting itself bodily out of a swamp and placing itself on high dry ground attracted universal attention. Photographs were circulated, and newspapers printed stories all over the country. We were regarded by the world as a model of ingenuity and energy.

Building for the Future

Once levelled off and squared away, we were ready for what were to be the first strides towards the great commercial and cultural developments of the next half century. As a start in civic betterment, the streets had been lighted with gas in 1850. The original water works—a system of hewn log troughs into which often as much fish as water were pumped—had to be replaced by one more modern and sanitary. The new works went into operation in 1866, water being taken in at the crib two miles off Chicago Avenue and brought through a brick tunnel 90 feet below the level of the lake to the pumping station near the present "Old Tower" at Michigan and Chicago Avenues.

Sewers constructed of oak boards provided for refuse disposal. Street improvements, the first horse car line in 1859, and the completion of the new Court House were all signs of Chicago's rapid progress. We were building for the future.

In the meantime, Chicago was fast becoming an important manufacturing center. The first of the Titans was Cyrus H. McCormick with his newly invented reaper long before the railroads came. He was a pioneer whose example was rapidly followed. Iron furnaces came into the district west of the river. Grain elevators reared their heads along the bank, and bridges were flung across the stream. George M. Pullman dreamed his dream of comfortable travel and began to build his "sleeper." Eight Chicago newspapers flourished, two of them in German. Schools and churches and libraries sprang up. A university was founded and theaters built.

Abraham Lincoln was nominated for President of the United States in a building, on Lake Street, called the Wigwam. The Civil War came and took its toll in both men and money, but Chicago's population increased by nearly 70,000. Our trade had been enormous, and war made it greater. Packing companies were established on the West Side. Banks were founded. Flour mills and lumber yards were strung along the river. Produce and materials received in the city during 1870 had been worth more than $260,000,000. Immigrants from every country on the surface of the globe poured into Chicago. Alien tongues were heard on the streets, and sections of the city became foreign settlements.

The Great Fire

Then, in 1871, came the Great Fire. I doubt if any single incident in the world's history more definitely marks the end of one episode and the beginning of another in the life of a city than does the Great Fire.

This holocaust that left 100,000 homeless and consumed more than 200 million dollars worth of property, sprang on an unsuspecting city like a jungle animal on its defenseless prey, ruthlessly despoiling all in its path.

After the fire had burned itself out, Chicago had it all to do over again, but this time she did it better. The panic of '73 made recovery difficult, but it continued, for there was something inevitable about the future of Chicago.

The city we see now is the new Chicago, built so magnificently on the ashes of the old. Looking backward, we have done a great job, much of it accomplished under the stress of ambition and economic necessity. Looking forward, we are faced with problems caused by our successful growth.

World's Columbian Exposition, 1893.

Chicago Century of Progress, 1933.

CHICAGO IS PROUD OF ITS INDUSTRIES

By Fred J. Ashley

FOUR hundred "million dollar companies," 11,855 industrial institutions in the metropolitan area lying within a thirty-five mile radius of the loop, and an annual factory output valued at more than $4,000,000,000, meeting more than one-eighth of the total physical requirements of the nation!

Such today is the healthy picture of the same busy Chicago that in 1910, less than a generation ago, considered it was reaching the almost ultimate in development when its wares were valued at $1.281,000,000. Such is the same Chicago that in 1860, the year when Lincoln came to the city for his first presidential nomination, was ready to stage a good, old-fashioned celebration when its manufacturing hit the $20,000,000 mark.

The steady rise of Chicago to the position where it now stands, with more than 350 distinct classes of products credited to its energy and genius and the wares turned out annually in the metropolitan district surpassed in total volume only by the composite industrial performances of three of the busiest states in the union, has been paralleled by the remarkable growth of its individual manufacturing organizations.

As the internationally recognized institutions that make up our famous Packingtown have won their positions of unquestioned pre-eminence, so the city has seen its other enterprises assume great importance. Within two generations Chicago has watched the great plant of the Western Electric company climb from a little two-man venture in the '60s until today it is among the largest single employers of labor in the land. In a single generation it has seen the steel mills on the city's south side forge ahead until now they surpass Pittsburgh in volume of pig iron produced; and it has beheld with comparable gratification other equally progressive headliners of its industrial family make their marks in the fields of lumber, printing, clothing, furniture, and all the countless other lines characterizing current civilization.

The Packing Industry

In no other city on the globe are there such facilities for receiving, selling, and butchering live stock as there are in Chicago. Since the establishment of the first slaughter house in 1827, the successors of that unpretentious log structure have developed to the present Union stockyards, covering more than a square mile on the southwest side of the city. Production by the great packing plants in a good year has a value of more than $1.000,000,000. About one-seventh of all the meat produced in the United States comes from Chicago. A recent computation by the Chicago Association of Commerce disclosed that, as a comparison, the annual meat production here would be enough to feed the entire population of the fifteen largest cities in this country, which includes the major portion of the strictly urban population. In another comparison, the local production is enough to feed the entire populations of France, Belgium, Holland, Denmark, Norway, and Sweden.

Expressed more graphically, the number of hogs dressed in the Chicago packing plants in one year, if placed in line, would form a continuous procession from San Francisco to New York and back to Dallas, Texas. The total of all the animals received at the Chicago stockyards since their organization, unbelievable as the figures may seem, would make a line long enough to reach from the earth to the moon and back. The payroll of the packing plants amounts to more than $250,000 a day. Leading Chicago

The Steel Industry Is a Major Factor in Chicago's Greatness.

Known the World Over for Its Stock Yards and Meat-Packing.

firms in the industry are Armour & Co., Swift & Co., and Wilson & Co.

Telephone Equipment

Out on Chicago's west side stands another imposing testimonial to Chicago energy and vision. A two-man partnership in 1869, with ten unskilled employees producing the crude equipment that marked the earlier adaptations of electricity, the Western Electric company of 1937 is an international force.

Originator of 90 per cent of the electric communication apparatus that has welded the North American continent into one self-contained unit and sponsor for practically all of the foreign ventures into the field of sound projecting devices, Western Electric is convincing proof of what can be accomplished in seventy years.

While the very nature of its success has led to expansion elsewhere, the chief scene of the Western Electric's operations has remained in Chicago. The great 200-acre Hawthorne works of the company out at the city limits on 22nd street was started in 1905 to continue the growth begun in a dingy loft on Kinzie street, and nurtured during the '80s and '90s in more commodious quarters on Clinton street.

Today, with more than 100 humming laboratories and factory buildings, and a personnel of approximately 18,000, Hawthorne towers industrially as the largest single manufacturing institution in Illinois.

Steel

In the Carnegie Illinois Steel company Chicago has an organization that has been one of the motive powers in carrying the city forward to its position of ascendancy where it now rivals Pittsburgh in steel matters.

In fact, statistics for the first few months of this year show that if local foundries and mills continue their upward climb the old cry of "Pittsburgh for steel" will be soon forgotten.

The history of the Carnegie Illinois Steel company is one of important mergers and expansions. Organized in 1889 as a consolidation of several plants in Chicago and near-by cities, the company reached out again a decade later to take in several additional companies, along with a steamship company and three railroads. Then, in 1901, followed its alliance with the United States Steel corporation, and the march was on.

One of the most convincing evidences of its growth is to be found in its production figures. In 1899 it had a capacity of one million tons of ingots annually. Today its plants are capable of ten times that amount and in recent months have been showing an output of better than 80 per cent of capacity.

From its railroad yards roll train after train loaded with pig iron, billets, rails and rail accessories of all kinds, plates, structural steel, merchant bars, alloys, and coke.

At many times the company has boasted as high as 25,000 employees, while its payroll has frequently topped fifteen million dollars annually.

Agricultural Implements

The part Chicago has held for nearly a century in the manufacture of agricultural implements is widely known. Just as the farmer has looked to Chicago for the disposal of his grain and the sale of his cattle, so he has regarded it as the main source of his labor-saving machinery.

Today as a consequence Chicago's farm implement and associated plants occupy 480 acres, or three-fourths of a square mile of ground, all within the city limits. In normal times these factories employ more than 20,000

The Manufacture of Agricultural Machinery, a Pioneer Industry in Chicago.

Chicago Leads in the Manufacture of Telephone Equipment.

workers with 80,000 others directly dependent on their prosperity.

One of these factories, the McCormick works, is the largest, as the Deering works is the second largest, implement factory in the world. Similarly, the McCormick twine mill occupies first rank in that branch and the tractor works is the best equipped and probably the largest plant in its particular field.

The supremacy of Chicago in farm implements manufacture dates back to the establishment by Cyrus Hall McCormick in 1847 of his first factory, situated on the north bank of the Chicago river. It is interesting now to recall that in 1848 this factory was able to produce only 700 reapers.

Later, another of the great pioneers and founders of the agricultural implement industry, William Deering, removed his factory to Chicago, doubtless for reasons akin to those which prompted Mr. McCormick to choose this city as his first site.

In 1902 the McCormick and Deering companies and several others united themselves into the International Harvester company, principally for the purpose of extending their trade in foreign fields.

This consolidation, and the remarkable success that attended the new company's efforts to develop European trade up to the beginning of the great war, had much to do with putting and keeping Illinois and Chicago at the head of American agricultural implement industry.

Railroad Equipment

Chicago's leadership in railroading has been paralleled by another of its industries—the Pullman company. As an operating organization owning approximately 10,000 private cars that cover annually a combined distance of more than a billion miles and catering annually to millions of extra-fare passengers, the company is a national institution. In its other activity—that of actually building cars—its record is equally impressive.

The Pullman works, as it is known, has a capacity of 125 passenger and 1,500 freight cars and 15,000 car wheels a month. At Michigan City, Ind., also in the Chicago industrial district, the company operates a smaller plant, where a force of 3,500 craftsmen duplicate the output of the Pullman works in freight cars and car wheels.

During the past two years, another railroad innovation has arisen to give added strength to Chicago's industrial position. With the advent of the new streamlined train, there has been born on Chicago's westerly borders the plant of the Electro-Motive corporation at McCook. Owned by the General Motors organization, this infant enterprise that already counts its employees in the four figures and that for months has been operating on a 24 hour a day basis, today is turning out most of the new diesel locomotives that are giving new life to the transportation industry. Month by month the plant itself grows in size with no one able to foretell its eventual possibilities.

Motor Car Accessories

While Chicago has never loomed up prominently in automobile manufacturing, it does boast the Stewart Warner company, the largest factory in the world for motor car accessories.

Containing more than a million square feet of floor space and employing more than 5,000 skilled workers, the company's plant in the city's northwest side embodies all that is most modern in machinery and most efficient in methods of production.

The main building, where for years speedometers, automobile bumpers, and the like occupied the center of the stage, now forms the hub around which have grown the plants of the company's important subsidiaries—the Bassick Alemite corporation, the Bassick Manufacturing company, and the Stewart Die Casting corporation.

Like its sponsor company, the die

(Turn to page 52)

Aerial View of a Portion of the Area Occupied by the Vast Oil Industry.

"THE GREAT CENTRAL MARKET"

By Paul W. Kunning

ONE hundred and four years ago, Chicago held its first election. There were but twenty-eight qualified voters, and thirteen of these ran for office.

If the percentage of our citizens running for offices today seems somewhat comparable to those earlier days, then in this respect only is Chicago unchanged. In all of its other aspects it has been a development so remarkable as to be without parallel in history.

As late as 1850 Eastern writers regarded Chicago so slightingly that they spoke of it as a fishing village and fur trading post whose business was on a decline. They reported back to their papers "It may grow a little larger and acquire a bit more business, but it will never amount to much. Certainly it will never have any inducements to offer any business man."

Like many a modern writer, those earlier reporters were too close to the picture to get the true perspective. Theirs was not the gift of vision which caused Father Marquette, Chicago's first white visitor, to write in his notebook as early as 1673: "Here, some day, will be located the capital of a great inland empire."

A hundred years ago, Chicago had less than 4,000 population; today its citizens number 3,600,000.

Seventy-five years ago our Eastern friends spoke lightly of Chicago's merchandising possibilities. Today Chicago does one-eighth of the nation's average annual business.

Situated in the very heart of the world's most fertile and prosperous valley with bountiful resources of mine, forest, and transport, it was inevitable that Chicago should grow. It is equally inevitable that Chicago will continue to grow.

Retail Trade

It is with Chicago's growth and development in retail and in wholesale merchandising that this article will deal. Its other aspects will be left to other writers.

The story of Chicago's retail trade is the story of the city itself. It is a tale of 160 acres of farmland that became the world famous Loop. It is a story of a State Highway with but a few scattered dwellings that became State Street, and of other paths and byways that have grown into almost a hundred other retail sections, each with its centers of interest and each with stores as the hub.

It is a story, also, of men. Men of vision, such as Potter Palmer, who, convinced of the city's destiny, moved the retail section from Lake Street where the growth was retarded because of the proximity of the river, over to the State Highway. Men like Ernest J. Lehmann, who brought the horse car to his store door. Men like Marshall Field, like C. W. Partridge, Charles Netcher, Levi Z. Leiter, Elijah Peacock, and others who developed the foundation of the most famous retail street in the world.

It is also the story of the Wieboldts, the Lyttons, the Goldblatts, the Beckers, the Kleins, and others who, in later days, brought the department store to the outlying districts, stimulating cities within the city.

The fact that this is the Jubilee Year, the 100th Anniversary of Chicago's incorporation as a city, lends interest to the merchandising efforts of those retailers of earlier years.

It was not until the Gay Nineties that style, for example, began to creep into retail advertising. Plush coats with tight waists having leg-of-mutton sleeves and Columbian collars were being presented as the latest mode. Previously they were advertised simply as shirt-waists, further ad copy being confined almost exclusively to "at greatly reduced prices."

Stylish, trimmed turbans and toques, newly arrived from Paris, added charm to Milady's appearance in 1898. High-heeled shoes were then the subject of heated discussion by physicians, but were considered THE thing for evening wear. Incidentally, many a preacher of that day mentioned those same high heels as convincing argument that the world had certainly fallen on evil days.

Rules for employees are of interest, especially in these days of 40-hour weeks and sit-down strikes. The guide for good conduct of the early Seventies stated: "Employees must go to church regularly. They may have one night off for church going and a second night off for courting, if their intentions are serious." What a fertile field for breach of promise evidence in such a rule were it to apply today. Evidently the swains of those days

View Along the Most Famous Retail Street in the World.

had far less difficulty in making up their minds than does flaming youth of today. Another rule stated: "Employees must remove their hats when waiting on female customers." Stores were open six nights a week. They could be opened on Sunday only in the event some good customer ran out of smoking tobacco.

Strange as these rules seem today, they were nevertheless an orderly part of a soundly established business —a business which then and ever since has vigorously kept pace with the growth and development of the city it served.

State Street is too well known to require detailed mention. Suffice it to say that all of the nation's most progressive retailers look to State Street for leadership and inspiration.

Chicago gave the department store to the world, and it is in this field of retail merchandising that the city is best known. Chicago's department stores annually do a total of 400 million dollars worth of business.

Food stores constitute the second largest group of retail estalishments from the point of sales. There are over 17,000 of these types of stores in the city, one for every sixty families.

Chicago today has 44,382 stores whose sales this year will approximate one and three-quarter billion dollars. An army of 160,000 men and women are employed, and the payroll totals more than 175 million dollars a year.

Wholesale Distribution

Chicago earned its title, "The Great Central Market," because it was and is, in fact, the great central market place for tens of thousands of merchants established within its trading area. Competent authorities estimate that 50 million people live within a night's ride of Chicago. The merchants supplying this vast population look to Chicago as their principal source of supply.

What are the borders of the Chicago market? This is a difficult question to answer, for the borders vary according to commodities. Generally speaking, however, it may be roughly outlined as that area bounded on the north by Canada, on the east by a line drawn through Cleveland, on the west by Denver, and on the south by the Arkansas and Tennessee Rivers. The retail merchants supplying this vast area can leave their homes in the evening, be in Chicago the next morning, spend the day in the city's compact wholesale market, and be at home ready for business on the following day. Chicago is the only buying center in the entire nation where such economy in time and money is offered.

Chicago Leads in Mail Order Houses.

It is impossible to give anything like a comprehensive description of Chicago's wholesale distribution in one short article; but the following paragraphs may indicate something of its strength.

For example, anything a merchant requires in dry goods and general merchandise to stock his store may be found in Chicago, where the largest open stocks of dry goods and general merchandise in the world are maintained.

Four of the best known nationally advertised lines of men's wear are manufactured here. Chicago-made men's apparel is sold by merchants in every city in the United States and in practically every town with a population of 2,000 or more.

Every state in the union is served by Chicago manufacturers of millinery and ready-to-wear. The number of dress houses has increased 233% in the last twenty years. Five of the largest manufacturers of millinery in the world are located here.

The American Furniture Mart has made Chicago the furniture capital of the nation. It is stated that 70% of all of the furniture made and sold in the United States is produced by the firms having a headquarters in this one building.

Hardware is another item in which Chicago ranks first. Closely allied are tools and cutlery, sporting goods, housewares, paints, and varnishes.

The Statistical Board of Review of the Imperial Board of Trade of London has conceded to Chicago world leadership as a jewelry jobber center. Chicago's jewelry trade has increased from fifty million dollars to two hundred fifty million dollars in the past two decades.

"The world on its travels packs its duds in Chicago-made luggage," goes the well-known saying. Trunks made in Chicago are shipped to all corners of the earth, and its leather specialties, such as handbags, purses, and wallets are as popular in the eastern markets as they are in the trade centers of the Mississippi Valley.

The story could be continued almost indefinitely. No less authority than B. C. Forbes has recently listed other Chicago "firsts" including "the distribution at wholesale of shoes, pianos and musical instruments, foodstuffs, radios and radio accessories, parlor lamps and shades, household electrical and gas appliances, and many other items."

The erection of The Merchandise Mart in Chicago only a few years ago has started a new chapter in Chicago's merchandising history. In addition to giving to Chicago the distinction of having the world's largest commercial building, it has already brought to Chicago the added honors of floor-covering capital of the nation and leadership in gifts, artwares, and novelties, and curtains and draperies. The magnitude of this single enterprise is further indicated by the fact that it has a daily working population of 17,000, a city in itself.

A potent factor in the tremendous development of the Chicago Wholesale Market during the past quarter of a century has been The Chicago Association of Commerce. Through its leadership the market has been more highly organized than that of any other city.

There are 6,462 wholesale establishments in Chicago. Their employees number 83,000; their sales will exceed 4½ billion dollars this year.

HUB OF THE NATION'S HIGHWAYS

By John T. Rutter

CHICAGO, the greatest transportation center on the globe, holding first rank among the cities of the world as a railroad, bus, truck, and aviation center, has achieved its premiership in a little more than a century. It was in 1834 that the first lake vessel entered the Chicago river, and fourteen years later that the first railroad started out. Sixteen years later still, George M. Pullman built his first palace car. In 1918 the first airmail arrived, but another nine years elapsed before the Chicago municipal airport was opened.

The flat swampy land through which the Chicago river flowed sluggishly to the lake offered little promise as a site for a great city in the days when the Indian travois and the bateaux of the French voyagers represented the commerce of what is now the Middle West. When the westward tide of migration began to increase, borne on the creaking wheels of the Pennsylvania Dutch-built Conestoga wagon, Chicago began to grow. Its one advantage was the priceless one of geographical location. Here the paths of empire intersected, and where they intersected traffic paused. There grew up a trading center and trans-shipment point, and so Chicago was born.

nland Waterway Through Heart of Chicago

Chicago to this day remains a terminal center, although it may be that the newer forms of transportation, the highway and airway carriers, may to some extent alter this characteristic. So far as the railroads are concerned, the city remains unique in that no regularly scheduled trains, freight or passenger, pass through it. There is no train entering here that does not terminate here. There is none leaving here that does not originate in Chicago.

The World's Railroad Center

It is to the railroads that the mind turns first, instinctively, in weighing Chicago's position in the transportation world. Here is the agency that nourished its growth. Here is the agency on which it is primarily dependent today to supply its needs and to carry into the channels of commerce the fruits of its production.

Three years after incorporation, Chicago's population as shown by the decennial census of 1840, was but 4,470; and ten years later, two years after the opening of what is now the Chicago and North Western Railway, the city numbered less than 30,000 souls. In the next twenty years the population increased ten-fold, and the fame of the city as a rail center was established.

Chicago, last year, although boasting but half the population of its rivals, surpassed New York and St. Louis combined in railroad activity as measured by train arrivals and departures, tonnage loaded and received, passengers carried in and out, and other business done relating to the rail carriers.

Here are a few facts and figures testifying to Chicago's rail greatness. The area of the Chicago Terminal District is about half again as large as the total land and water area of Rhode Island, 1,750 square miles; it is served by enough track to span the continent more than twice, 7,726 miles; there are 255 freight stations, 372 team tracks, 206 freight yards, 18 freight carshops, 100 freight car repair yards, 82 engine houses, and 12 locomotive repair shops.

These represent the facilities of 38 railroads, including 23 trunk lines and 3 electric carriers. Last year they handled 189,000,000 tons of freight, 102,000,000 tons inbound and 87,000,000 outbound, requiring 600 freight trains daily, equally divided between arrivals and departures, to effect the movement. The 36,000 cars handled daily would make a freight train something like 360 miles in length. It might be pointed out that the head end of such a train would be 20 miles east of Cleveland before the markers on the caboose blinked their farewell to Chicago.

The passenger traffic handled by the rail carriers into and out of Chicago daily last year amounted to an average of about 175,000 people or more than the entire population of such cities as Des Moines, Flint,

Union Station. Railroads from All Directions Terminate Here.

Grand Rapids, Hartford, New Haven, or Tulsa. To handle approximately 125,000 commuters a day, the roads operated 947 suburban trains daily, while 483 through trains were required for the 50,000 out-of-town travellers arriving or departing each day. A majority of all the spectacular streamlined flyers now operating in this country as well as a great preponderance of world famous American trains claim Chicago as one of their terminal stations.

With all this activity and the allied activities of the car and other railroad equipment makers, it is not surprising to find that the railroads employed 80,000 workers in Chicago last year, about 6½ per cent of the total direct employment for the industry. Counting employment in allied lines the total was not far from 200,000, representing about 150 000 families and approximately one-tenth of the employment total for the city.

One of Chicago's Many Bus Stations.

Leader in Air Transportation

Turning from the workaday and familiar atmosphere of railroad operation, the next most striking evidence of Chicago's transportation greatness is in the romantic field of the air. Here again this parvenu among great cities leads all the rest. Trailing the lusty newcomer are Newark (serving New York), Cleveland, and Washington, among American metropolitan centers, and London, Paris, and Berlin among the old world capitals.

Seven airlines use the facilities of the Chicago municipal airport, connecting the city with all parts of the United States, Canada, Mexico, and South America. Operating 106 regularly scheduled flights daily over eleven routes, these lines carried well over a quarter of a million passengers into and out of Chicago last year, in addition to something like 3,700,000 pounds of air mail dispatched and around 1,000.000 pounds of air express handled. This meant that nearly a quarter of the country's air passenger travel, more than one-fifth of total air mail poundage, and better than one-eighth of total air express business centered in Chicago. Approximately 47.000 planes arrived at the airport in 1936 and a like number departed, meaning that every six minutes of the day or night a plane was landing or taking off.

In the Forefront in Trucking and Bus Operation

The facts and figures regarding highway transportation are somewhat more obscure than in the case of the rail carriers and the air lines, but with fourteen of the interurban bus lines and most of the large contract freight haulers centering their operations here there is little doubt that the volume of commercial vehicular traffic places Chicago in the forefront of American cities and, on that basis, of the world.

Statistical information of even the contract freight carriers is jealously guarded, and the thousands of individual operators complicate the picture to a point where nothing definite can be stated. But leaders of the industry rank Chicago first as a trucking center, and a similar ranking is accorded in the field of bus operation. The city is the focal point of nationwide bus travel. Just as the Air Transport Association of America, representing all scheduled air transport operators of the United States, as well as United States operators in international operation, have established their headquarters here, so have the bus and truck operators recognized Chicago as the key city of the highway transportation system. Policies controlling their operations emanate from here. Bus depots here, in the number of 88, witness the arrival and departure of 290 buses daily.

Water Transportation

First in the Chicago field of transportation, the water carriers have lagged behind competing agencies. In water borne foreign trade the city does not rank in the first twenty although the Great Lakes-St. Lawrence seaway and power project, should it ever become an actuality, would undoubtedlly reshuffle the standings. Recent figures have placed Chicago back of Toledo, Ashtabula, and Cleveland in the "Big Four" of Great Lakes ports for export and import trade.

In the field of domestic water-borne commerce Chicago enjoys a better rank and in volume of iron ore receipts ranks ahead of all other lake ports with Cleveland not far behind. In normal years the city ranks third in volume of lake traffic handled, being surpassed by Duluth-Superior and Toledo, although inclusion of the Indiana ports in the Chicago industrial area—Gary, Indiana Harbor, and Buffington, would raise its rank to second. With world leadership in four of the five fields of transportation already held, Chicago can afford to be gracious and leave the one remaining prize to the contention of its older and less fortunately situated rivals among the great cities of the world.

Boats from All Countries Drop Anchor in Chicago Harbors.

THE PLAYGROUND OF THE MIDDLE-WEST

By V. K. Brown

GIRDLED by sixty square miles of outlying native woodland, reserved for the recreation of its people, Chicago has shown the same provident thoughtfulness in providing privately and publicly for the leisure of its citizens within the city itself. From the Dune lands of Indiana, in an almost continuous chain of forested hillsides, the picnic grounds, golf courses, and general pleasure ways of the county system of Forest Preserves, follow the interesting moraine of the last of the glacial advances in this region, back to the lake again, well to the northward of the city. Millions annually go thronging out from their city homes to renew contact with Mother Nature, beating paths through the trees and undergrowth of this wildwood. With vision toward the future, everything possible has been done in these great preserves to retain the native landscape at its best for coming generations. Waters have been impounded, here and there, to make artificial lakes, but they have been so treated in landscaping as to lend the utmost in naturalness of appearance, not to do violence to the surrounding scene. Even some of the marshes have been jealously guarded to preserve a refuge and feeding ground for bird life. And while golf courses and swimming pools have been introduced, their architecture, together with that of the shelter buildings, has been carefully adapted to the central idea,--that of preserving, close to the city, some remnant, at least, of the original woods of Illinois.

Symphony Concert in Grant Park

Fly Casting

Social Settlements

Inside the city, provision for the recreation of the people, and for their social association in leisure hours, began, as so many social movements do, with the privately endowed and supported institutions, now federated through the Council of Social Agencies. Hull House, the scene of the life work of Jane Addams; Northwestern University Settlement, to which Harriet Vittum has devoted her talents and her capacities for human understanding; the University of Chicago Settlement, to which Mary McDowell gave so many years of service; and the Chicago Commons, reflecting the neighborly spirit of Dr. Graham Taylor and now presided over by his daughter, Lea Taylor,—these institutions pioneered in the service of society through the organization of leisure time undertakings of the people themselves. They became community club houses, where a friendly atmosphere was unfailing, to which the community might resort, assured of a sympathetic and understanding welcome. Aware of the meaning of such neighborhood institutions, other settlements began to appear, years ago, following these pioneering examples. The Y. M. C. A.'s, and the affiliated organizations, the Y. W. early offered a community, as well as a membership, service. Business men

Soldier Field at Night, Burnham Park.

and women availed themselves of the gymnasium classes, the programs of study and entertainment; boys' workers and workers with the younger girls afforded leadership and inspiration to the younger generation.

Youth Organizations

Out of the pioneering done by these agencies, supported only by private funds, there has come an impulse which over the years has developed into the modern recreation movement. Scouting, with its 20,000 boys in the Boy and Sea Scout branches of the organization, is entirely financed by contributions to the movement. In recent years, the great Catholic Youth Organization has come into being and prominence, as a movement on behalf of the youth of the church, taking its inspiration from its organizer and leader, Bishop Sheil, and the devoted workers enlisted under his direction. The Young Men's Hebrew Association, the B'Nai Brith, is offering increasing service to their youth; and societies, such as the Polish National Alliance, have similarly interested themselves in the boy and the girl of their parent membership, in the stimulation of sports and leisure occupations. In the Turn Vereins and Sokols, the people of the old world brought to the new, gathering places where the culture and sociability of the former homeland might be perpetuated. Already they had learned the need of a vigorous physical development for the maintenance of health and efficiency. But their turner halls ministered not only to the need of sports and physical development; they provided also for social and cultural activities. Institutional churches, with social and recreational facilities, as well as rooms for devotional purposes, became increasingly numerous, influenced, no doubt, by the proofs, which secular institutions of a recreational sort provided, that along with the spiritual development, a physical and social development is essential to life. Schools gradually gave more thought to the physical educational program and to cultural development in music, in drama, and in the home arts, as well as in manual training.

The City Park System

The city park system felt the effects of the early experimenting. About the turn of the century there began a major development of municipal provision out of public funds for the leisure time of the city, to supply especially the open spaces which the private organizations were needing so keenly. Larger plots of ground were purchased for school sites, with areas for recess periods, vacation time, and before and after school use by the children. Sixty-one school playgrounds are now maintained by a special departmental bureau of the Board of Education, providing not only the space and facilities, but also the leadership and direction needed to insure their social usefulness. The City government, in its Bureau of Parks, Playgrounds, and Bathing Beaches, maintains and operates 36 play areas, equipped for a wide variety of sports, games, and athletics, and also providing leadership and direction of numerous other recreational activities.

Community Parks

More extensively developed in Chicago than in any other city is the system of community parks, provided with community center buildings, especially planned and equipped for the free use of the people in their leisure hours. The idea of the small park fieldhouse was an original Chicago concept, dating back to about the year 1900. It was planned to bring the advantages of a larger park, in miniature, over into the residence neighborhoods, where congestion was greatest. Each of the parks provides at least some landscaping, trees, shrubbery, grass, and flowers. Each brings Lake Michigan close to the people in its swimming pool or wading pool for younger children. It provides, as do the school and city playgrounds, for out-of-door sports, athletics, and games. Generally, it has on outdoor area set aside and fenced for a girls' outdoor gymnasium, with a small children's playground adjoining, and another area for boys and men, equipped with appropriate apparatus, but especially affording open space for miscellaneous play and for games. It has, again, like the

One of the Many Beaches on the Lake Front.

One Cub to Another

Ice Boat Regatta.

Skating on the Midway.

school and city playgrounds, a common central field for games requiring larger areas, such as football, soccer, and baseball, which areas are usually flooded in winter for skating, but are also available for community festivals and celebrations of various sorts.

The Community Fieldhouse

The park playground has, in general, a more commodious building, however, than the city playgrounds or the school playgrounds, in its fieldhouse proper. Generally, the fieldhouse has a large assembly hall, a gymnasium for men and another for women, each provided with necessary shower and locker facilities. It has also a number of club rooms, one of which, wherever sufficient space permits, houses a branch of the public library. And of late years some of the club rooms or basement space has been equipped with mechanical tools, work benches, and tables, for crafts and art crafts club groups. Assembly halls are almost universally provided with stage facilities for dramatics, the seats being removable so that the halls may be used for a variety of social purposes; and, generally, the structure, provided for the free use of the people of the city, lends itself to almost any desired community purpose. The Chicago Park District offers a service to the varied leisure needs of Chicago through 90 such community buildings,—the greatest plant for public recreation possessed by any city in the world. These 90 buildings are located in the 134 parks of the city park system.

Bathing Beaches

The larger parks along the lake shore were, early in their history, breathing spots for the citizens in summer's hot weather. Gradually public demand inspired both the parks and the city proper to institute and operate bathing beaches. Inspired by the city planning dream of Daniel H. Burnham, Chicago set about reclaiming for the city itself the lake shore, to develop it as a continuous strip of park land, the front doorstep of the city. Negotiations with private owners enabled the parks to acquire the riparian rights to some 28 of the city's 30 miles of lake frontage, and work has been going forward continuously for more than two decades, filling in submerged lands to afford public access to the lake-front in broad areas of park lands, a continuous lake-shore drive, with bathing beaches liberally provided along the shore line. The City

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ART AND ARCHITECTURE

CONTRIBUTE TO THE BUILDING OF THE CITY

By Daniel Catton Rich

The Art Institute of Chicago.

VISITORS from a distance, especially from Europe, are frequently amazed at the activity in the Art Institute. Observing groups of students streaming up the steps, discovering crowds in the exhibition galleries, noting the attendants at lectures or readers in the library, they are apt to remark, "Where do all these people come from? Is it this way all the time?" And when they hear a few statistics they are still more astonished, and go away repeating phrases like "a million visitors a year," "fourteen thousand members," and "the largest art school in the world."

Now, numbers in themselves mean nothing. The United States is a nation of huge figures, and until we get into the millions and the billions we hardly react. But, humanly speaking, such statistics in connection with a museum and school of art *are* significant, for they show that the Art Institute is playing an active role in the life of Chicago. For nearly sixty years Chicagoans have been supporting this institution. They have seen it grow from small, experimental beginnings in a rented building at the southwest corner of State and Monroe Streets to a museum which is known the world over for the excellence of its collections and to a school which has trained many of the leading artists, designers, and teachers in the United States.

The Inception of the Art Institute

Its inception was not the usual one. Many galleries of art began with bequeathed collections, to which were added other gifts and bequests. The Art Institute has had great donations in its history—no American museum has benefited more from the generosity of collectors, but it started off from a different premise. What the public-spirited officers and trustees of 1879 wanted to establish was primarily a center to teach drawing, painting, and design. Looking around at the vast commercial growth of Chicago, they saw that we needed a

Gothic Gallery, The Lucy Hand Buckingham Memorial.

Courtesy of the Art Institute of Chicago.

"The Assumption of the Virgin," by El Greco.

Courtesy of the Art Institute of Chicago.

place where the promising young men and women might learn the rudiments of craftsmanship without spending, as was then the custom, long, expensive years in foreign study. They saw that the public needed training through an appreciation of the art of past and present in order to understand what our artists were producing. This double conception—a very significant one in the history of culture in Chicago—was admirably stated in the first prospectus issued in 1879:

"The Trustees propose to establish a museum and a school of art embracing within their scope, painting, sculpture, architecture, decoration, and art in its technical application. Not the esthetic gratification of a few lovers of art only is concerned in this undertaking, but it is the desire and expectation to interest the public generally, and to produce results so practical and appealing so strongly to the taste, the pride, and the enlightened foresight of our citizens as to merit and receive their prompt and substantial support. . . ."

Chicago, then, was to have an Institute which fitted her particular needs. This was not to be another Pitti, or Uffizi, or Louvre. It was useless then, as it is now, to attempt competition with the great storehouses of Europe. Neither was the Institute simply an academy. In addition to studios and classrooms, it was to have galleries, exhibitions, and lecture halls where student and citizen should meet through the common communication of interest in art. It was to be democratic, not for the "esthetic gratification of a few," but for the many.

Its Early History

The history of the succeeding fifty-eight years has justified the belief of the founders. The Institute soon outgrew its first quarters; by 1887 it had its own building at the corner of Michigan Avenue and Van Buren Street. In 1893 it took one of its most significant steps when it arranged with the World's Columbian Exposition to occupy as a permanent home the building constructed for the World's Congresses. Soon this structure was enlarged with new wings and galleries until in 1937 Chicago has one of the largest and most modern museums in the world.

In a similar way the collections have grown in importance and quality. When "a party of gentlemen" in 1883 got together and presented Charles Sprague Pearce's "Beheading of John the Baptist," they began a collection of paintings that now includes not only an historical survey of the great masters of the past but a sequence of nineteenth century French canvases unequaled even in France. Collectors in Chicago—and Chicagoans have been intrepid buyers—have not only given their finest examples but have often gone a step further and acquired for subsequent gift just those works which the museum lacked. In 1892, when the picture collection was in its infancy, a great purchase of Dutch paintings was made from the Demidoff Collection in Florence, and Rembrandt, Hals, van Ostade, Hobbema, and many others first came to Chicago. In the same way the Institute secured El Greco's magnificent "Assumption of the Virgin," a masterpiece by the Spanish artist who was just being discovered again after three hundred years of neglect.

Other departments grew in a parallel way. Today, galleries of decorative arts display medieval glass, Wedgwood, historic furniture, and textiles, many the gift of Chicagoans who have collected these objects themselves. The Oriental galleries house Chinese, Japanese, Muhammadan, and Indian arts, which only now are beginning to attract the attention of the wider public. In one room in this series there is an unsurpassed group of early Chinese bronze vessels. In another a changing selection of Japanese prints is on view from the second largest collection in the United States. The division of prints and drawings started with etchings "on Japanese rice paper and satin"; it now contains superb impressions of the masters and the moderns.

The Art School

All during this time the School was expanding. Many museums have schools of art attached to them; the Institute's School has been the very center of its development. Here new methods of teaching have been tried and new courses added to the curriculum. Famous painters, including Chase, Bellows, and Kroll—to name only three—have taught here; from its doors have gone forth many well trained graduates who have played an active part in making America conscious of the place of the artist in contemporary life. This accent on youth has given the museum part of its liveliness; it could never become "a moss-covered mausoleum" as long as its halls and galleries were full of animated students. Students have benefited from the museum; no longer, as in 1879, do they have to rely on sepia prints of the "old masters" or hope for a trip to Europe to see Rembrandt "in the original."

"Young Girl at an Open Half-Door," by Rembrandt.

Courtesy of the Art Institute of Chicago.

Connection With Armour Institute of Technology

In 1893 began the significant connection with Armour Institute of Technology. Chicago has a world place in architecture. The pioneer spirit in our later nineteenth and twentieth centuries readily found release in the brilliantly inventive buildings of a Louis Sullivan and a Frank Lloyd Wright. To this the Armour Institute of Technology and the Art Institute have contributed an important share. In 1894, after the Columbian Exposition, the French government gave to the museum a great collection of casts of historic French architecture. Here the architectural student can study the portals of St. Gilles or Rouen not through photographs or elevations, but in unique plaster replicas of the original. The Burnham Library, established in 1912 by a gift of Daniel Burnham, father of the Chicago Plan, puts at the command of the architect and student a remarkable collection of historical and technical material constantly expanding in usefulness.

As the Art Institute grew it increased its activities to cover new fields. A Children's Museum and a Theatre are two of its most recent departments. In the first the child is shown technical processes as well as paintings, drawings, and sculpture by, and of interest to, children. The yearly attendance to this museum alone averages some two hundred thousand. The Goodman Theatre is one of the finest small playhouses in the United States; it is now used as a school of acting and production, with a series of plays for members and the public. The library of the Institute has grown from a shelf of books in the Director's office to the well-equipped Ryerson Library with the largest collection of art books west of the Alleghenies.

"Oh, You're Jealous," by Paul Gauguin.

Courtesy of the Art Institute of Chicago.

Loan Exhibitions

From the first the Institute has refused to be simply a static collection of objects. As early as 1888, the Director vigorously insisted that the museum should also function as an exhibiting body:

"Regret is often expressed that we have not a fine permanent collection of pictures but it is certain that for our annual members, on whom the support of the Institute depends in great measure, a changing collection with recurring exhibitions is far more attractive than any permanent collection would be. . . ."

At the beginning a series of loan exhibitions was arranged; works of art, owned locally, were borrowed and shown with outstanding possessions lent by collectors and artists elsewhere. This custom culminated

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SEVEN WONDERS OF CHICAGO

By Rita Fitzpatrick

SOMEWHERE in Elysium the ancients are jealous. Bearded and much benectared they shake their hoary heads over the modern day. It hurts their pride to appear old-fashioned beside any age in this business of civilization.

Chicago, alone, has seven wonders to rival their selected choice of many years ago, the Shedd Aquarium, the Field Museum, the Adler Planetarium, the Oriental Institute, the Chicago Historical Museum, the Brookfield Zoological Gardens, and the Museum of Science and Industry. These seven institutions give Chicago, once a rowdy stockyards town, great prominence in the cultural and scientific world.

Above: Chicago Historical Museum.

The Shedd Aquarium

Beauty, fierce and delicate, lives at the Shedd Aquarium in Grant Park at the foot of Roosevelt road. As a memorial to the late John G. Shedd, Chicago merchant, the $3,000,000 glowing white octagon of Georgia marble surpasses any institution of its kind in the world. Of simple Doric architecture with pure classic design, suggestive of marine life, it forms a harmonious unit with its neighbor, the Field Museum.

The building, which was built in 1929, contains 132 exhibition tanks as well as a balanced aquarium room given over to the display of tiny, rare tropical fish. It also includes sunken gardens, laboratories, a complete hatchery for restocking public waters, and a fisherman's school showing the past and present methods of obtaining fish in all parts of the world. At the end of the collecting season there is in the aquarium an average of 10,000 specimens of fish, representing about 250 distinct species, which range from the breath-taking, tiny, blue angelfish with its golden tipped fins to the hideous sea cow. It is directed by Walter H. Chute and operated and controlled by the Shedd Aquarium Society. Ninety thousand dollars a year are required to maintain forty-five aquarists, collectors, chemists, photog-

Right: Oriental Institute, University of Chicago.

raphers, engineers, guards, and accountants. Chicago never does anything in a small way.

The Field Museum

A bit across the road, and south, stands the people's university, the Field Museum, lofty and monumental with its Ionic architecture captured in Georgia marble. Founded in 1893 by the late Marshall Field, the museum did not have a permanent home until 1920. Its collection now embraces all the principal manifestations of Nature and is devoted to four outstanding branches of natural science, anthropology, botany, geology, and zoology.

Here life is revealed in its primitive and complicated stages, and knowledge is couched in vivid and accurate forms. A stroll through the various halls, flanked with their prehistoric figures, finely wrought ancient Chinese art, and scientific plant reproductions, opens up a broad vista of the universe from creation to the present day.

In the halls of anthropology are staged the art and industry of savage tribes, the culture of lost or decadent civilizations, and a comparison of oriental and occidental art. Botany finds its explanation in exhibits of the natural sucession of plant life from the lowest order to the highest. The geology display shows crystals, meteorites, and fine marbles, all of delicate beauty and systematic order. The zoology halls are filled with accurate replicas of animal life from all parts of the world, from the invertebrates to the mammals in their natural habitat.

To the museum flock our university classes, tourists, knowledge-thirsty residents, artists, and keen-eyed children. Directed at the present time by Clifford D. Gregg, it is unrivaled among similar institutions throughout the world.

The Adler Planetarium

Chicago, not blinded with its neon lights, points with pride to the Adler Planetarium, where the stars parade at command. Contrary to Emerson's contention that "The man in the street does not know the star in the sky," this institution uncovers the sky as it looked "to the slave who built the pyramids for the Pharaohs" and prophecies how it will appear to the futuristic street cleaner 15,000 years from now.

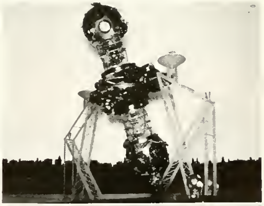
On the northerly island off the Field Museum, the building, a gift of Max Adler, rests like a giant beehive made of stone and copper. Beneath the linen-lined dome of the planetarium a spectator senses all the vastness of empty space as a Zeiss projector, like a mammoth magic lantern, casts a myriad of 5,000 stars above him. Here, in this "schoolhouse of the sky," can be learned the changing aspect of the sky due to the course of the seasons or the shift of latitude, the Midnight Sun, the Southern Cross, and the history of sky moods. It is directed by Dr. Philip Fox, professor of astronomy at Northwestern university.

Out of the 19 planetariums, spotted throughout the world and clustered in Germany, the Adler institution is the most beautiful, most complete, and the most expensively equipped.

The Oriental Institute

Chicago is curious, and its penchant for probing into the lives of people gives to the city the Oriental Institute at the University of Chicago. Built under the supervision of Dr. James H. Breasted, and now under the direction of Dr. John A. Wilson, far flung

Field Museum of Natural History.


Adler Planetarium. Showing Zeiss Projector.

Museum of Science and Industry.

study is made here of early life in the Near East. Constructed in 1931 for $800,000, which was donated by the International Education Board, a Rockefeller foundation, the Institute is an Elizabethan Gothic rectangle at 58th street and University avenue.

Were it not for adventure and an endowment of $5,000,000 the building would be a lecture hall. Instead, archeologists have traveled and dug, and the results include the towering statue of Tutankhamon of Egypt, the silver bronzes and gold bar of Menes, the oldest inscribed piece of royal jewelry in the world, and the great stone bull found in the palace of Sargon II. "Among unusual American museums, it is the most unusual."

The Chicago Historical Museum

Equally prominent for a widely different collection is the Chicago Historical Museum. Proud of its accumulation of patriotic and historical relics, the museum stands in the southwest corner of Lincoln park, a pink and white replica of the Hall of Independence in Philadelphia.

It is sectioned into a Spanish Exploration room which, incidentally, houses the anchor of Columbus; the Paul Revere House; the French Exploration room, which brings to light the belongings of Father Marquette; the British Colonial room; the Senate Chamber, a reproduction of the original hall; the Washington room, exhibiting his Winthrop desk used when commander-in-chief of the Continental army; the New Republic room; the Western Expansion room; the Civil War room, containing among its relics the cloak of Robert E. Lee and the saddle of General Grant; the Victorian parlor; Chicago exhibits; and the Lincoln hall, displaying the coat he wore the night of his assassination, his tall silk hat, and his gray shawl.

There are, also, Mrs. Thorne's Miniature rooms, Indian exhibits, early Illinois antiques, and a costume gallery. Everything in the museum is displayed with a view of reproducing the original setting. In this way it is a picture

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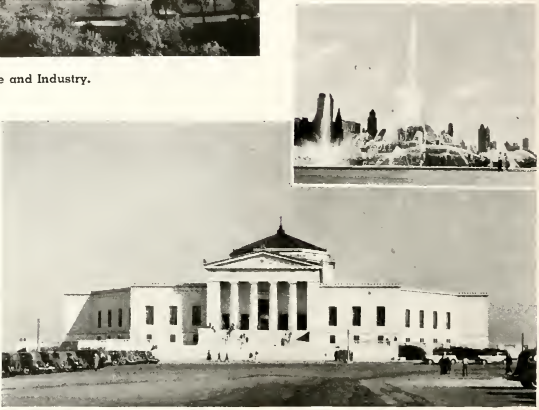


Shedd Aquarium. (Insert) Buckingham Fountain.

Tigers in Natural Setting at the Chicago Zoological Park.

MUSIC IN CHICAGO

By Eugene Stinson

If you get into a taxicab and ask the driver to take you to the opera house the chances are two in three that he will answer, "Do you mean the one on Clark street or the one on Wacker drive?"

Now, as far as Chicago's opera house is concerned, there is only the Civic opera house, for when we go to the Auditorium we mention it by name. The fact that there is in Clark street a theater called Cohan's Grand Opera House is merely a memento of pioneer days. The name is a survival from the period when many communities, having outgrown the "halls" they had first built, in the strength of their rugged growth constructed an "opera house" to house any attraction that might pass their way. The prairie states are strewn with "opera houses" that may never even have witnessed an operatic performance. I doubt that an opera has ever been given in the very building that is now referred to in semi-theatrical circles as "Cohan's Grand."

Early Musical Events

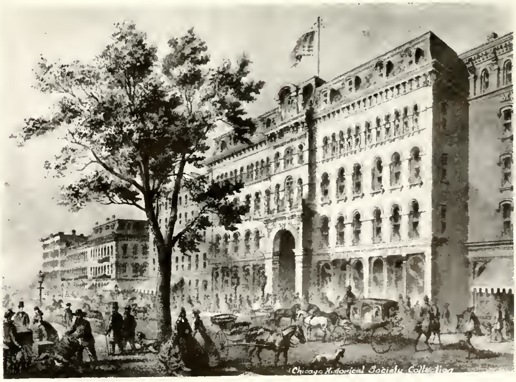
The first recorded musical event in Chicago was a concert given in the Presbyterian church (Lake and Clark streets) by the Old Settlers' Harmonic society on Dec. 11, 1835. After a second concert, in the month following, the society ceased to exist. The initial program was listed to begin at 6:30 P. M., and the tickets were fifty cents. There was an indescribable heterogeneity of material, including arias by Rossini and Masiniello, a song by Mozart that nobody even remembers nowadays, some glees, an overture, the "Dead March" from "Saul", and ditties by Kreit Krietzers, Webbes, and Lewises that can now no longer be identified.

If the Old Settlers' Harmonic society perished early, it was instantly succeeded by other and still other musical societies, and the city's first musical program was the beginning of a freshet that has never ceased to flow. The hundred years of Chicago's music have in the main been pioneering years, as its whole history has been and as is even today reechoed in the city's famous "I Will." Chicago is pioneering musically in the year 1937; we have admirable institutions, and we have made no little history. The fact remains that we are still discovering music, and still discovering means of making its acquaintance and of maintaining it in our civic life. What was true a hundred years ago has been true throughout the century that followed: our musical growth has in the main depended upon the individual effort of private citizens. The populace responds; it is persons who afford it the occasion to.

In the first fifty years of Chicago's music there were two major episodes that might have deterred its development, the Civil War and the Great Fire. They rather lent impetus to our music, however; and it may even be that in the midst of disaster, people learned to turn to music for something they had not before quite sensed that it contained. Up to the year 1861 there had been an intensive musical life here, some of it provided by Chicago musicians and much of it provided by itinerant companies that early in our history found Chicago both a strategically geographical point and a hospitable public.

Jenny Lind came to Chicago, by no means the first notable to make music here, in 1854; she was assisted by a violin soloist, Theodore Thomas, who was to exert so definitive an influence here many years later. We gradually learned to know even what opera is. And when war finally broke

Theodore Thomas, Founder of the Chicago Symphony Orchestra.



Crosby Opera House and Art Gallery.

out, a Chicagoan, George F. Root, composed two songs, "Tramp, Tramp, Tramp, the Boys Are Marching," and "Just Before the Battle, Mother." Within a quarter of a century of its municipal life, Chicago already boasted a composer.

Crosby's Opera House and Art Gallery

A Philharmonic society, with Hans Balatka as a leader of extraordinary executive force and vision, was formed in the fall of 1860, and did not cease to function during the war. In 1864 there was being constructed an "academy of music," later to receive another name, which opened under brilliant—indeed amazing—circumstances as Crosby's Opera House and Art Gallery. Uranus H. Crosby was a man little short of genius, who made "a colossal fortune of two millions of dollars" in two years from speculations in whiskey. His opera house was built on a large double lot on the north side of Washington street between State and Dearborn, and seated 3,000. Crosby hit upon the scheme of offering possession of his new building to the winner of a lottery, the tickets costing $5. The drawing was made Jan. 23, 1867, with all possible precautions against suspicion of fraud, and the winner was announced as A. H. Lee, of Prairie du Chien, Ill. Mr. Lee prudently accepted Mr. Crosby's astute offer of a cash settlement, and the opera house remained in the hands of its builder. Its cost was reported at $1,000,000, but may have actually been only half this amount, or, as one estimate read, not more than $376,000. Crosby issued 210,000 lottery tickets, retaining some few thousand himself. His venture brought him both financial profit and enormous publicity.

His opera house had already been opened when he raffled it away. On account of the assassination of Lincoln, the opening had been deferred until April 20, 1866, with a performance of the opera, "Il Trovatore," sung by some of the best artists of the day. Its history was brilliant, but brief. It played the leading musical attractions from its opening until its destruction, when newly decorated and awaiting its reopening on the very night of the fire of 1871. Theodore Thomas and his orchestra were to have given a concert, and Thomas arrived at the railway station to be greeted by flames, and quickly sought refuge in Joliet. Not music alone, or opera alone, was given at Crosby's Opera House. Any spectacular production was played there. Wilbur F. Storey, editor of an early Chicago newspaper called the *Times,* was bitterly opposed to Crosby whom he attacked together with his opera house. When the "British Blondes" came to Chicago to play in Crosby, Storey's attack upon the production aroused special furore. Two of the ladies of the company, sagely attended by two stalwarts, sought to horsewhip Storey, were arrested, and fined $100 each, but were greeted with ovations on their appearances upon Crosby's stage.

West Front, Chicago Civic Opera Building.

Early Musical Organizations

Following upon the fire with all the city's theaters ruined, musical events were given in a church in one or the other, the south or the west oases of habitation left by the flames. But musical activity was not stilled. The Handel and Hayden choral society of Boston generously provided the Chicago Oratorio society with a large collection of books, and oratorios were rehearsed and sung. This library in turn was destroyed by fire in 1873, but the Apollo Musical club, the city's oldest surviving musical organization, had already been formed at the original instigation of Silas G. Pratt and under the presidency of George P. Upton, with A. W. Dohn, from Milwaukee, as conductor.

This period witnessed the growth of festival organizations. Lilli Lehmann and Max Alvary sang in a two week season of German opera under Anton Seidl. An innumerable succession of opera companies visited the city until at last, in 1885, the city was ready for Ferdinand W. Peck's project to create the Auditorium. This building, which was to serve the city's now more lavish scale, as Crosby's Opera house had served, was dedicated Dec. 9, 1889 amid circumstances as distinguished as they could be made, with Adelina Patti as a soloist and the President, Benjamin Harrison, making one of the addresses.

Theodore Thomas

When the Theodore Thomas orchestra (now the Chicago Symphony orchestra) was at length firmly established in 1891, its programs were played in the Auditorium, with the grand old veteran, whose name the orchestra bore, as its conductor. By the time that public funds had been

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EDUCATIONAL INSTITUTIONS

SIGN OF PROGRESS

By John P. Lally

CHICAGO is destined to become the educational center of the nation, and in no other facet of the city's sparkling diadem is the I WILL spirit more clearly outlined.

Every variety of education is available here in the four major universities, a great technological institute, technical schools, and scores of private schools whose curricula range from teaching the blind to "read" to occupational therapy.

Latest surveys show that more than 60,000 students enter Chicago's schools and colleges (not including public and parochial schools) every year, that 70 per cent of the students come here from outside Illinois; and 40 per cent of the total enrollment finance themselves by working in stores, factories, and offices. As a matter of fact, the students do not seem to be particular about the sort of work they do, and it's not at all unusual to find a taxicab driver studying for his M. A. degree.

Although the city's public school system is subject to political winds which have a way of blowing sand in the gears of efficient operation, courageous groups of civic-minded citizens continue to struggle, year after year, to rescue the public school system from the hands of the spoilsmen.

But this fight is strictly local. And to the world outside Chicago, the warring factions usually present a united front which tends to give the impression that all is well, that our schools are the very best in the land.

And it's not at all unusual to see such organizations as the Association of Commerce and the American Federation of Labor standing together, blending their voices for the adoption of the same public school program. They may dispute and bicker over economic issues, but when it comes to educating the youth of the city they stand together.

In the financing of the public schools approximately seven million dollars is needed every year. Of this sum two and a half millions come from the city, three and a half millions from the state, and one million from the federal government.

Included in the public school system are 37 high schools, three junior colleges, 329 elementary schools, six pre-vocational schools, four vocational, one Normal College, two schools for crippled children, one parental school, and two schools for truant boys. The teaching personnel consists of 13,232 men and women.

Just now Chicago is deeply concerned over its secondary educational system because statistics show that

Rockefeller Chapel, University of Chicago.

Cudahy Library, Loyola University.

out of every hundred students that enter the elementary grades only 50 reach the first year of high school; and out of that 50 only ten graduate; and of the ten graduating only three go on to college.

Yet the high school curriculum is built around the theory that all high school students enter college; and, as a result, the high school teaching program is slanted on that theory. To effect a revision of the curriculum is a serious matter, the motivating thought being to bring our secondary educational system closer to the work-a-day world of today.

University of Chicago

But it's in the universities that Chicago takes great pride. The largest, the University of Chicago, opened in 1892, has a world-wide reputation as a center of research and scholarship. The only three Americans to win the Nobel prize in physics, A. A. Michelson, Robert A. Millikan, and Arthur H. Compton, did their work at Chicago. In the various efforts that have been made to rate the American universities, Chicago and Harvard have been placed at the top.

Robert M. Hutchins President of the University since 1929, is one of the educational leaders of the country, his vigorously expressed beliefs as to the need of clarity in the organization and content of education having aroused widespread discussion among his fellow educators.

It was under President Hutchins that the "Chicago Plan" was inaugurated in 1931. The "Plan" is framed to provide a general education in the first two years, with specialization in one of four broad fields of knowledge in the last two years. It also emphasizes that the acquisition of education is the responsibility of the student. No class attendance is required, and a student may take the comprehensive examinations whenever he believes himself able to pass them. The University has approximately 3,000 under-graduate students and about the same number of graduate students. Its assets are $116,500,000 of which $65,400,000 is endowment.

Northwestern University

Northwestern University in Evanston, Illinois, is one of the leading institutions of higher learning in America. Established in 1851, it has developed through the succeeding years until today it comprises eleven different schools as follows: The College of Liberal Arts, the Graduate School, Medical School, Law School, Dental School, and the Schools of Engineering, Music, Speech, Commerce, Journalism, and Education. It has an enrollment of full-time students numbering over 6,000. In its evening departments located near downtown Chicago, it has over 8,000, and in its summer session over 4,000. The total enrollment of the University at the present time is, therefore, over 18,000.

Of the 6,000 full-time students, approximately 55% come from Cook County in the State of Illinois. The remaining 45% come from all States in the Union and from practically

Deering Library, Northwestern University.

Moot Court Scene, De Paul University.

every foreign country. Certain of the professional schools such as Law, Medicine, and Dentistry, which have achieved international reputation, attract students from every corner of the globe. The Dental School, for instance, has a larger enrollment of students from foreign countries than any dental school in the world. Last year twelve professors of Northwestern University were invited to lecture on their specialties before university audiences in foreign countries.

Of Northwestern's 38,000 living graduates, 55% reside today outside the State of Illinois. The State of California, for instance has more Northwestern graduates than any State in the Union except Illinois. Graduates of Northwestern are to be found today in practically every country in the world, most of them practicing medicine, law, dentistry, or engaged in business and educational enterprises.

De Paul University

De Paul University, founded by the priests of the Congregation of the Missions (Vincentians), saw its humble beginning as Saint Vincent's College in 1898. In the space of thirty-nine years, De Paul has grown from a tiny college to a great metropolitan cultural center. Today, it is known as one of the leading Catholic educational centers in the Middle West having given much in culture, knowledge, and the spirit of right thinking to the youth of America.

From a one-building school house, De Paul University now is housed in two north side campus buildings and a downtown skyscraper. In these quarters approximately 8 700 students are enrolled within the year. De Paul is a university composed of the College of Law, the College of Commerce, the uptown and downtown Colleges of Liberal Arts, the College of Music, Secretarial College, and the Department of Drama.

Loyola University

Loyola University, conducted by the Society of Jesus, grew out of St. Ignatius College which was founded on September 5, 1870. It soon outgrew its quarters on Chicago's west side and moved to its present site on the shores of Lake Michigan in Rogers Park. It is now comprised of five professional schools, the College of Arts and Sciences, School of Commerce, University College, and the Graduate School, with an enrollment of 6,000 students. Its professional schools consists of a school of law, medicine, dentistry, and social work.

The Rev. Samuel Knox Wilson, S. J., President of Loyola since 1933, is one of the leading Catholic educators of the United States. Under his direction the university inaugurated the "honors course" system now in effect which calls for an integrated academic program in the student's field of concentration, an allied field, and in general culture. Ninety per cent of the students registered in the college come from the Chicago area, while its professional schools attract

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Lobby, Lewis Institute

Philip D. Armour, Jr., Memorial Window, Armour Institute of Techno

HISTORICAL SKETCH OF ARMOUR INSTITUTE OF TECHNOLOGY

By Walter Hendricks

NO more typically American a story of the founding of an American educational institution could be presented than that of Armour Institute of Technology. It does not begin with the opening of its doors in September, 1893. It goes back to a mission Sunday school in which Joseph F. Armour, a merchant of considerable means, was interested and to which he contributed liberally for its support.

This mission, started in 1874, three years after the Chicago Fire, and located in a building previously occupied by a saloon, at Thirty-first and State streets, was called Plymouth Mission because it was an extension of the activities of Plymouth Church, of which Joseph F. Armour was a member. When in a short time the quarters became cramped, the Sunday school was moved to Apollo Hall at Twenty-eighth and State streets; and again, in 1883, back to Thirty-first street, at Armour avenue.

Bequest of $100,000 to Establish Armour Mission

When Joseph F. Armour died, in 1881, he left a bequest of $100,000, to be used by his brother, Philip D. Armour, in establishing a Sunday school for the people of the community. To this amount, Philip D. Armour added $100,000 of his own; and after sending an emissary abroad to study buildings used for mission purposes, he built "Armour Mission" and turned it over to Plymouth Sunday school.

The mission was to be broad and wholly non-sectarian, free and open to all to the full extent of its capacity, without any restrictions whatsoever as to race, creed, or class. On the first Sunday in December, 1886, seven hundred little cosmopolitans "crashed the gates" to be counted among its first members.

Classes in Handicraft Started

Among the many workers and teachers sent from Plymouth Church to assist in this experiment in practical Christian democracy, Julia A. Beveridge must be singled out for special consideration. Appointed mission librarian in 1887, she tried to stimulate an interest in reading. Soon realizing, however, that story books were not enough to keep idle hands and minds from mischief, she started a class in clay modeling.

Surprised at the outcome, she enlisted the services of five young men from a manual training school to teach wood-carving, tile-making, freehand and mechanical drawing, and designing. Before the end of the year she had 400 boys in the Saturday morning classes, and 350 girls in the afternoon classes in dress-cutting and millinery. Little did she realize that she was laying the foundation for Armour Institute of Technology.

Joseph F. Armour.

Impressed by the skill of many of the youngsters, she collected the best specimens of their carving and modeling and displayed them to the sympathetic patron, Philip D. Armour, who, now vitally interested in the work, came often to see what progress was being made. And it is reported that on one occasion he went away deep in thought.

Gunsaulus' Sermon

We must go back now to Plymouth Church, where Philip D. Armour is sitting, as formerly his brother Joseph sat, listening to a sermon by a new minister, one Frank W. Gunsaulus, a young man in his thirties, who ten years earlier had been a Methodist circuit-rider in Ohio but was now a silver-tongued orator and pastor of a large and wealthy Chicago church, declaring what he would do if he had a million dollars. He would establish a school to help young people who wanted to help themselves.

That sermon is a classic, and the story connected with it is known by every man and woman who ever attended Armour. "Do you believe in those ideas you have just expressed?" the rich merchant asked the poor minister after the service. "I assuredly do," was the firm response. "Would you carry them out if you had the means?" the packer questioned. "Most certainly," said the preacher. "Very well," replied the decisive Armour; "if you will give me five years of your time, I will give you the money."

As one editorial writer expressed it years later on the death of Gunsaulus, "The man who had the means grasped the man who had the vision, and together they made the dream come true."

Founders of Armour Institute

These, then, speaking generously, were the founders of Armour Institute of Technology: Joseph F. Armour, who left a bequest for a mission; Julia A. Beveridge, who formed classes in handiwork; Frank W. Gunsaulus, who preached a sermon on what he would do with a million dollars; and Philip D. Armour, who supplied the means for building the school.

It will be years, however, before Gunsaulus and Armour have formulated their plans. The seed has been

Frank W. Gunsaulus

Philip D. Armour

sown, the earth folded over it, and the ground watered; but as yet we see no seedling arching its way up out of the ground.

Backgrounds

We observe the two of them, the preacher and the packer, putting their heads together. You think, what presumption! Neither of them knows anything about starting a school. But both are graduates of the school of hard-knocks.

Frank had preached his way through college, and as an itinerant preacher had moved many a man to repentance. Philip, when only nineteen years of age, had set out from Stockbridge, New York, in 1851, with three other fellows, determined to walk to California to dig for gold.

One of the fellows died on the way, and the two others turned back. But Philip trudged on and reached his destination six months later. He didn't know much about digging for gold, but he had been reared on a farm and he knew how to dig a ditch, so he dug ditches instead at $5 a day and $10 a night until he had got enough money together to buy a ditch of his own to carry water to diggers and washers; and in five years he had saved up $8,000, perhaps more, of ditch-dug gold.

Now a rich man, he rode back to Stockbridge in style, planning all the way home to buy a farm and settle down and marry. But the girl he had considered marrying some day had got tired of waiting and is said to have wedded the village horse doctor instead. The young Armour turned about and eventually landed in Milwaukee, where, with $500 of his fortune as his share, he formed a partnership in a produce and commission business. Observing, however, the demand of travelers and others for smoked and pickled meats, he formed a more ambitious partnership in meatpacking. Then came the Civil War, a demand for their meats, and a fortune for the partners.

With characteristic foresight he and two of his brothers, Joseph and Herman, moved to Chicago shortly after the termination of the war and formed a meat-packing company of their own, in 1867.

At the moment Philip D. Armour and Frank W. Gunsaulaus are planning to build a school, Armour & Company are doing with a single exception, Marshall Field & Company, twice as much business as any other merchant in the world. That was in 1890.

Planning a New School

Gunsaulus and Armour were not sure, despite the sermon, what kind of school they wanted to build. Only one thing they were certain of: it was to be practical and designed for young people who wanted to help themselves. Armour himself had been turning such things over in his mind ever since the death of his brother Joseph. It was the sermon that brought him to his decision to act.

Armour and Gunsaulus began collecting data, making careful inquiry into the workings of philanthropic institutions not only in this country but also in Europe. They wrote letters to Pratt, who had founded an institute in Brooklyn, and to Drexel, who had founded one in Philadelphia, and to others.

Not content to sit and read about schools, they decided actually to look them over. "We climbed up to the top floor of the old Cooper Institute to see evening classes in drawing," says Gunsaulus. "Anyone else would have been worn out with heat and travel. Yet he chattered like a boy, and remarked, 'This school was made out of Peter Cooper's glue, and no wonder it's a good institution. . .' "

Armour's interest was now at white heat. He had spent a million dollars building blocks of apartments, over 200 of them, as an endowment for the Mission, the revenue from which was to be used for its maintenance. At this time there were over 2,000 members, 30 officers, and 113 teachers.

Corner Stone Laid in 1891

He finally came to a decision. He would build the new school across the street. In the *Mission Visitor* of October, 1890, we read as follows: "Mr. Armour is now erecting a large manual training school, which will be equipped for work in accordance with the most approved plans." And further, "The children who desire to attend the industrial schools held Saturday mornings and afternoons should report to Mrs. Beveridge. . . With the completion of the new building next year, this work will be absorbed by the large training school which will then be established."

The merchant and the minister watched daily their dream taking shape stone by stone. You see, it was a practical and realistic dream. And as the building grew, so grew their plans. Up to 1890, they had been making these plans. In 1891, they had laid their corner stone. In 1892, while men were audaciously erecting on a swamp, five miles to the south and east of them, a World's Columbian Exposition and a University

Mrs. P. D. Armour

J. Ogden Armour

of Chicago, Armour and Gunsaulus were raising their own monument to the practical educational needs of a new world.

A School of Technology, with Dr. Frank W. Gunsaulus as First President

And as their building grew larger and took shape, they realized their early aims were not sufficiently inclusive. They had planned a scientific academy as the center, around which were to be various schools or departments. But now they have enlarged the scope. The old academy is no longer the heart; but a technical college, with departments of mechanical and electrical engineering, architecture, and library science; and other departments or schools, of domestic arts, of commerce, of music, and of kindergartens. On December 1, 1892, Frank W. Gunsaulus took office as the first president of Armour Institute. He had kept his word.

Horizon Broadened

The public cannot keep pace with the packer and the preacher. Dr. Gunsaulus feels compelled to announce in the *Times,* in March, 1893, "that Armour Institute has widened its original aim and is becoming more like a school of technology.' .At the same time he laments the fact that "the idea of the institution itself is not thoroughly understood. There is apparently a belief that it is something like a reform school. "Why, actually, a mother came to me and wanted to have her son entered for the purpose of reforming him." And he goes on to explain that it is open to all alike and that they shall come in and be educated in the "splendid practical sciences of the nineteenth century."

But a month later, another Chicago newspaper announces that "already the horizon is broadened" and that "each added department is an outgrowth of encouraging conditions." The attitude of the Institute itself regarding the academy is well worth noting, for it declares that it will "prepare students to enter the technical college of Armour Institute or the scientific courses of Yale, Harvard, Cornell, Chicago, Michigan, and similar first class institutions!"

By summer of 1893, the uncertainty in the minds of the public had disappeared. The *Journal* says, "Before long the work of Armour Institute will be known from one end of the country to the other," and a New York magazine has described the school as a "magnificent temple of education." Another New York commercial periodical advocates founding a textile technical school as a department of the new Armour Institute, "this great institution of technology for the masses."

Philip D. Armour makes the front page by proposing a new and breezy kind of religion for the school he is founding. "The religion of Armour Institute will be sixteen ounces to the pound, but undenominational; and it makes no difference to me whether its converts are baptized in a soup bowl, a pond, or the Chicago river."

How conventional educators and educated must have shaken their ears at such an utterly homely and honest remark!

"Never were conditions so favorable for success from the outset as are those which surround the new undertaking," says the new president. A month before the opening, four hundred students have been enrolled, and applications are coming in with every mail. The faculty, all carefully selected, some of the men outstanding in their fields, are busy receiving and installing the various apparatus which, it is claimed, will make the new Institute more complete than any other technological institute in the country.

Proudest they are of their mechanical and electrical equipment. The World's Fair has been one of their principal hunting grounds, and nearly anything of value is said to have the Institute purchase tag attached to it. There is a passing friendly note, too, in the fact that Girard College and the Massachusetts Institute of Technology have donated their entire exhibits to the new school.

Armour Institute and Art Institute Form School of Architecture

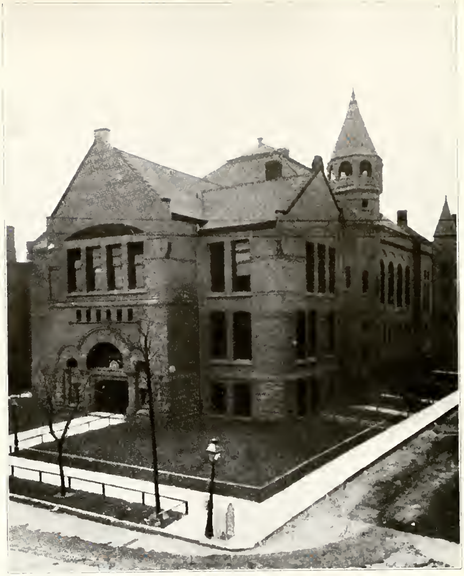
The trustees of Armour Institute and the directors of the Art Institute of Chicago have held a significant meeting and have made the momentous decision to join hands and run the architectural branches of the two institutions in conjunction with each other. The new school just formed is to be known as the Chicago School of Architecture of the Armour Institute, the scientific courses to be taught by Armour and the artistic by the Art Institute.

"Yes," says the youthful president, unabashed, "the Armour Institute is destined to lead every technological institution in America."

The Institute Opens

At length the storm breaks. It is September 14, 1893. The doors officially swing open to admit its first students. One report has it that 800

Julia A. Beveridge



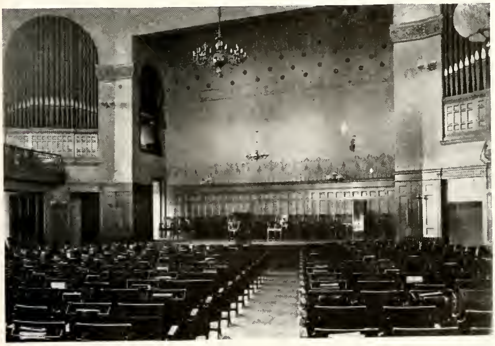
Armour Mission, Built in 1886.

entered and that 2,000 were turned away. This was an exaggeration. But this much is true; the capacity was far short of the demand, and every department was taxed to its utmost. And the president had to scurry about and find additional instructors.

Everything is new and clean. On the walls are engravings and copies of the old masters. In the library, already, are 10,000 carefully selected volumes, some of them rare; a collection of autographs; and a few manuscripts. The dignified Boston *Transcript* genially remarks that Armour Institute needs only time to become one of the first technical schools in the country."

Phillips Brooks, the eminent bishop, who had been preaching on Sunday afternoons in the hall of Massachusetts Institute of Technology in Boston, was to have dedicated the new institute. But death had intervened, and now his portrait hung beside that of the generous founder, in the office of his friend, the president. Dr. Gunsaulus, it should be remembered, was still pastor of Plymouth Church, the largest Congregational church in Chicago.

Auditorium of Armour Mission.



"The whole country congratulates Mr. Armour," says one newspaper in the west, "and wishes his institution which ranks at once with Massachusetts Institute of Technology, Stevens Institute, and Rensselaer, the unbounded success it deserves and will enjoy."

Five Schools Founded in 1892

One of the leading engineering magazines declares that "the establishment within a single year of two great institutions of learning, the one a great university and the other what promises to become a great school of technology, is an event unique in the history of modern cities, and of which Chicago, at present occupied with her great World's Fair, will one day be quite proud."

In this same year the Field Columbian Museum and the Chicago Academy of Sciences were also established, and the Chicago Art Institute enlarged. This astonishing development in higher education and the growth of educational institutions in this World's Fair period was referred to by one Chicago newspaper as "on a scale worthy to be called "Chicagoan." It added, "the youth who

L. C. Monin

F. U. Smith

are to make the future Chicago the ideal city of the world, the real center of the arts and belles-lettres, no longer have to seek training elsewhere . . ." and referred to Mr. Armour as one of the first to feel the impulses of the new educational movement in Chicago and one of the most practical in giving it realization.

The First Year

The work of the first year included the courses in the scientific academy, which provided preparation for entrance to any "first class college or university." Even at the outset, expression was made of the hope of the founder and of the directors to do away with all such preparatory work as could be done as well elsewhere. From this, one observes that the original plans of Armour and Gunsaulus had changed significantly, and that now the intention was to establish a technological institution.

The courses offered in the technical college were mechanical, electrical, and mining engineering. The first two were for four years; the last was discontinued at the end of the first year.

In the commercial department it was likewise felt that as the department broadened it should take on an advanced character and become less a school for the teaching of stenography and bookkeeping and more for instruction in technical reporting and expert accounting.

Domestic Arts

In domestic arts the tendency was the same. The earliest notions considered the training of girls in household subjects, but this was soon changed to the more consistent aim of qualifying young women to teach domestic arts in other schools.

It is amusing, however, to look back at the beginnings and read the contemporary newspaper reports. In May, 1893, the *Inter-Ocean* ran the headline, "Making Good Cooks" and commented thus: "The authorities of Armour Institute seem to be in dead earnest in this matter, and if there is such a thing as bad home-keeping in Chicago it will not be the fault of this institute. Slightly earlier, a New York paper announced that "the purpose is to lift the haphazard management of the home to a level with administration of government in state and church."

The Chicago *Herald* went into details regarding the work proposed, and explained that "besides the regular courses in cookery for special and normal classes, there will be fancy courses conducted at the Institute or at private homes in the chafing dish, in invalid cookery, and in camping dishes." It declares further, and not without human interest, that "several gentlemen are already enrolled for some of these courses;" but it errs somewhat, perhaps, in stating that a "domestic labor bureau will be established,"—unless that was one of Mr. Armour's earlier practical and utilitarian ideas, against which, possibly, the pastor-president had to contend.

The limit of misapprehension must have been reached, however, in another newspaper announcement which stated that "cooking, washing, and mending are on the programme." The facts remain that in the domestic arts department, cooking, sewing, dressmaking, and millinery were taught, but not as the newspapers announced to girls and housemaids, but to young women who later sought teaching positions in high schools and colleges.

Activity in the domestic arts department commenced in the spring of 1893, before the opening of the technical college, a series of lectures being given on the subject of "house decoration" by lecturers from the World's Fair.

Kindergarten School

The course in the kindergarten school was of the same character. It was inevitable from the nature of the background of the Institute in the work of the Mission that such a department should become a part of the school.

For many years the Chicago Free Kindergarten Association had sustained and conducted free training classes in Chicago. It was therefore natural that this organization should have been chosen as eminently fitted to have charge of the Normal Kindergarten department of the new Armour Institute.

This department likewise functioned before the actual opening of the technical college. In fact, Armour Institute graduated fifty fair kindergarteners in June, 1893, three months before the Institute officially opened. The *Tribune* announced it as "Armour Institute's First Class of Graduates."

This affiliation with the Kindergarten Association continued until June, 1900; the following June the work in domestic arts was discontinued, thus terminating co-education in the technical college. The work in the scientific academy, however, was to continue for several years, the thirteenth commencement marking the end, in June, 1910.

In addition to the courses already mentioned, there was also a department of music; and concerts and recitals were an important part of the student's program. As now, there was a glee club and an orchestra; and instruction in organ playing was given by the organist of Plymouth Church.

Library Science

It is the school of library science, however, which deserves our notice, because this was the only school of its kind in the middle west and one of only four schools in the country, besides the New York Library School of Albany, giving this instruction. It speaks well for the bibliophile president, Gunsaulus, who had a passion for books, that he included such a course in the curriculum.

From all reports, the quality of the instruction was excellent, and the work creditably done. The applicants, called "successful competitors" by one newspaper, were young women of ability who were preparing themselves for positions as librarians. Trips of inspection were taken by the class, one a pleasurable boat trip to far-away Milwaukee.

That these young lady students were welcome goes without saying. And as the present-day, "boiler-plated" student reads this, he will long for the "good old days," for the "feminine touch" the student of those early years enjoyed, to break the monotony of his "forty-hour-week."

From one Chicago newspaper we learn that "the young ladies of the library science class at Armour Institute gave a reception and pink tea last night to the young gentlemen of the technical college. . . . The tables were spread in the library, which was beautifully decorated in appropriate color. Music was furnished by the Hungarian Mandolin Club." This was before the days of the "blues."

Even Mr. P. D. Armour, the biggest merchant in the world, paid a visit to the Institute in the afternoon and personally inspected the arrangements, and "manifested much interest

Top: First Musical Club.

Middle: Football in 1893.
(Note Co-eds' Support.)

Bottom: Group of Early Students.

Howard Monroe Raymond

and pleasure in the pleasant social entertainment in prospect." What a fairy godfather!

It must have been with reluctance that this work was given up a few short years later because of lack of space. Against their own will, the boys in steadily increasing numbers crowded out the girls, first the lovely librarians, next the kindergartners, and lastly—which was only human—the button-sewers and the cooks!

As a final testimonial to the ability of the work of the department of library science, the story should be told of a competitive examination given by the Civil Service Commission to fill a position of library clerk in one of the departments in Washington. A man was wanted, but the eight men who took the examination failed; the two women, both graduates of Armour, passed; and one received the appointment. When the department of library science closed, the director went to the University of Illinois and established a school there.

Cultural Activities

Other subjects taught during these first years included history and civics, biology and botany, ancient and modern languages, and English. It was at this time that Professor L. C. Monin, later dean, came to the Institute as an instructor in modern languages. The reason for his coming will be of interest to many. He could not collect his back pay (so he told me), from the then toddling University of Chicago; and not able to wait any longer, he came over to the then affluent Armour Institute.

The subject of English seems to have been unusually important, being required, says an announcement, "from the first year of the scientific academy to the last of the technical college." The aim is also worth noticing—"to produce no narrow one-sided specialists, but wide cultured All-around men and women. . . ."

The influence of all this could be observed in the activities of the students. The "Senate", the men's literary society, held monthly meetings; and at its open forum at the end of the first year, brief addresses were presented by three members on "Gladstone" as statesman, scholar, and orator,—with remarks by Dr. Gunsaulus, himself, who doubtless assisted the boys in the selection of their subject.

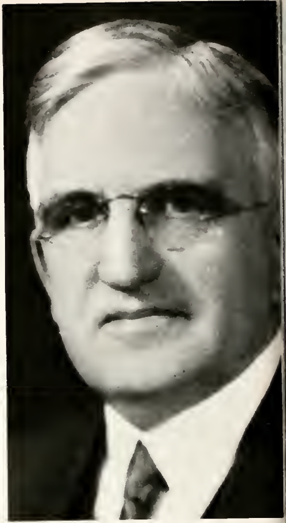
The ladies, who formed the "Armour Athene," were likewise engaged. At their open meeting, one member presented a talk on George Eliot, followed by a very solemn debate on the subject, "Resolved, that the prevalence of Fiction in modern literature has been, on the whole, more of a benefit than an evil." No record was kept of who won.

Every Friday at noon, assemblies, called "home gatherings", were held, at which the boys and girls were regaled with music or "some other treat." There were frequent recitals and concerts under the direction of the department of music, and always public lectures of one sort or another, almost wholly cultural. One program, perhaps typical, consisted of the following: "The Modern Novel" by Hamlin Garland, "A Sculptor at Work" by Lorado Taft, "The Ancestry of Painting" by Charles F. Browne, "The Art of Architecture" by Irving K. Pond, and "A Study of Musical Taste" by F. W. Root.

Public Speakers

One of the greatest public orators of his time, Dr. Gunsaulus was always inviting his friends to speak from the mission platform. What an opportunity the students enjoyed! Himself a liberal, Dr. Gunsaulus knew no barrier of color, creed, or class, nor of economic or political point of view. Excerpts from those speeches would make interesting reading.

In the years to come he will have Booker T. Washington, who, with Lincoln-like simplicity called upon the students to lend their co-operation in solving the negro problem. "The problem does not concern the black man alone. As we rise, you rise. As we fall, you fall. You can't harm us without harming yourself, and the deeper you reach down to lift up another, the stronger you will be for it." Later, came Senator Hoar, who said,—and with Philip D. Armour in his audience, "You are not in this world to make money. Far higher it is to make the *man*. Remember what Agassiz said, 'I haven't time to make money.'" Still later, President Eliot of Harvard. And at the twentieth centennial, William Howard Taft, President of the United States of America.



Willard E. Hotchkiss

But I am far ahead of my story. We are only at the end of the first year. Already one newspaper is saying, "Armour Institute has grown to be a wonderful school." In this same article Dr. Gunsaulus makes a significant statement. "Head, hands, and heart trained to work in unison, and you have the idea of what our school is struggling to accomplish. With such training comes sturdy independence, self respect, and an easy poise of ideas. Instead of being a mere mechanic, the man so trained becomes a controller of mechanism, a potent factor that a progressive world cannot afford to do without."

First Commencement

For the first annual commencement of the technical college, in 1897, Dr. Gunsaulus secured President Gilman of Johns Hopkins to deliver the ad-

(Turn to page 70)

AIMS AND ACTIVITIES OF ARMOUR INSTITUTE OF TECHNOLOGY

By H. T. Heald, Dean

IN 1932 joint action of the trustees, alumni, and faculty resulted in a survey of existing trends in technical education, and of current and prospective requirements of industry for technical graduates. Out of this study came a crystallization of the aims and activities of Armour Institute of Technology which resulted in the Armour plan. At about the same time the membership of the Board of Trustees was greatly enlarged, and Mr. James D. Cunningham, President of the Republic Flow Meters Corporation, and an outstanding public spirited citizen of Chicago, became its Chairman. The Armour Development Plan recognized the part which engineering plays in present-day civilization, and emphasized the fact that engineering education must be grounded in the scientific foundations of this civilization, and also develop a grasp of the business and social problems that arise from technical change.

In 1933, Dr. Willard E. Hotchkiss accepted the Presidency of the Institute, and proceeded with the development of the program indicated in the Armour Plan. Up until this time Armour Mission and Armour Institute of Technology had existed as separate corporations, but since for several years the Mission had been inactive and its buildings used by the Institute, in 1934 the Mission and the Institute were legally consolidated into a single corporation known as Armour Institute of Technology.

The new President and the Board of Trustees were faced with the problem of carrying out the educational development indicated in the Armour Plan and building up community support for the School. Various changes were made in the curriculum in order to keep the undergraduate courses abreast of the changing needs of engineering education. Principal among these were an increased emphasis upon work in Social Science and in English, and a revision of the program of instruction in shop courses to keep pace with modern practice in this division of technology. The location of the Institute in such an industrial center as Chicago has throughout the years given its faculty and its students opportunity to keep abreast of architectural and engineering projects. These contacts have been mutually advantageous, and out of them, as the founder early anticipated, have come distinguished contributions to industrial and social progress. The Development Plan pointed out the importance of keeping the work of the Institute in close touch with the activities which its graduates are to serve.

As a means of maintaining these industrial contacts the five-year cooperative course in Mechanical Engineering was added to the curriculum in February, 1936. This plan, which permits students to spend alternate eight-week periods in industry and attending classes, is designed primarily to make it possible for well qualified high school graduates of limited means to obtain a standard engineering education. Students who take the cooperative course secure during the five-year period two and one-half years of experience holding an industrial position in which their work is supervised and scheduled so as to give them an insight into the relationship between engineering and industry. At the end of the five-year period the student has completed the regular work for the Bachelor of Science degree. This course supplements the regular four-year course, but does not in any way replace it.

Another significant service which the Institute has rendered to Chicago throughout the last thirty-five years is represented by the work of the Evening Division. More than 20,000 students of Chicago have attended evening classes at the Institute, and in 1934 the Evening Division program was revised so as to provide (1) sequence courses in engineering and architecture for adults not interested in college credit or degree; (2) courses for high school graduates who wish to cover the first two years of a college course in the evening classes; and (3) graduate courses to be taken with or without credit for advanced degrees. The success of the Evening Division is evidenced by the fact that in the year just closed more than 2,000 students attended these classes. Postgraduate courses attracted more than 150 engineering graduates.

H. T. Heald

The translation of the Armour Development Plan into policy, procedures, and courses of study has meant increased contacts with the research division of industry and an increasing opportunity upon the campus for advanced scientific study and research. The growing importance of research led in April, 1936, to the creation of the Research Foundation. The Foundation is occupied both with research for industry and with basic independent research. On September 1, 1936, all of the research carried on in the laboratories of the Institute was incorporated in the program of the Foundation. The staff of the Foundation is made up of a group of scholars distinguished in their respective fields, some of whom confine their activities to research while others are occupied with both research and teaching. Practically all of the projects of the Foundation give opportunity for the employment of graduate students in the field of their special scientific and engineering training, thus furnishing an important stimulus to graduate study.

Recognizing the fact that a distinguished school of engineering must provide opportunity for its graduates and those of other institutions to obtain further specialized training

(Turn to page 64)

1. Registrar Interviewing Student.

2. General View in Library.

3. Engineering Science Laboratory.

4. Analysis of Mercury Spectrum in Department of Physics.

5. Use of Diagrams and Models in Mathematics Department.

6. Drawing Problem in Projection.

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7. Using Camera in Metallurgical Department.

8. Bacteriological Laboratory.

9. Measurements in Physical Chemistry.

10. Students in Chemistry Laboratory.

11. Practical Work in Industrial Chemistry.

12. Using Balances in Chemical Analysis.

13. Organic Chemistry Experiment.

* * *

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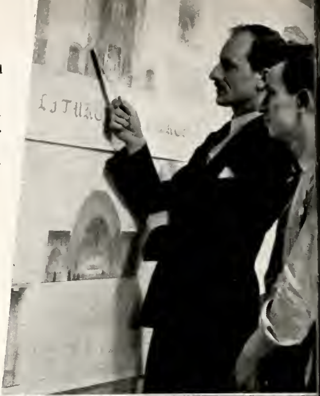
12

13

1. Modeling in Architectural Course.
2. Professor and Student Discussing First Mention Drawing.
3. Special Problem in Advanced Course.
4. Freehand Sketching.
5. Reproduction in Color.
6. Building Model to Exact Scale.

1



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7. Stress Analysis by the Use of a Model.

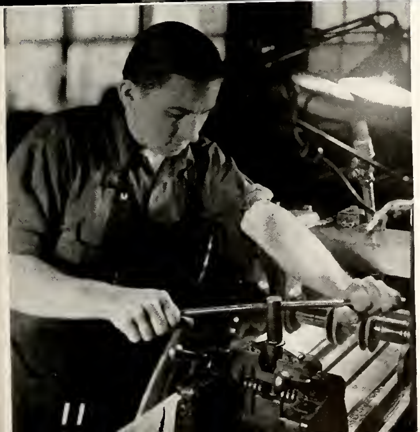
8. Motion Study in Social Science Course.

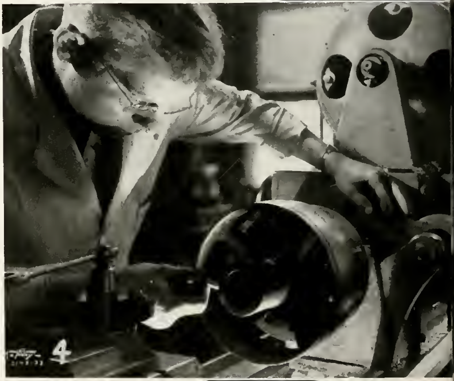
9. Students at Work on Aeroplane Engine.

10. Field Work in Civil Engineering.

11. Co-operative Student Operating Milling Machine.

12. Co-op Working on Assembly of Comptometer.





1. Test on Large Pump in Fire Protection Engineering.

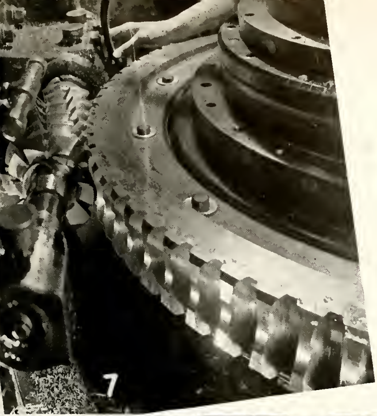
2. Student Operating a Balance.

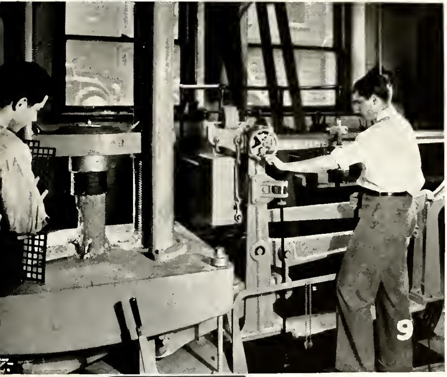
3. Practical Test of Fire Extinguisher.

4. At Work in the Machine Shop.

5. Measuring Water Distribution from a Sprinkler.

6. "Fire Protects" Investigating a Dry Valve.





7. Co-operative Student Cutting Large Bronze Gear.

8. "Co-op" Operating an Annealing Furnace.

9. Compression Test on Specimen of Concrete.

10. Practical Experience in Electric Welding.

11. Combining Theory and Practice in Industry.

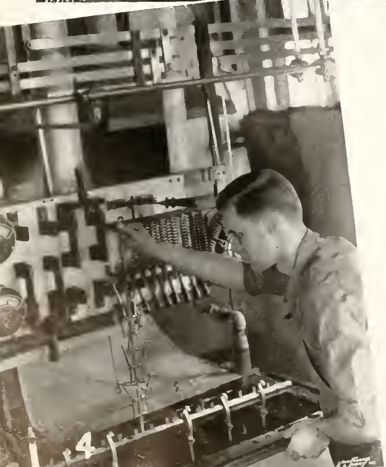
12. Students in Armour Tech Foundry.

1

2

3

1. High Temperature Test of Insulating Material.
2. Conducting Test in Filtration Laboratory.
3. Experiment in Oil Research Laboratory.
4. Co-operative Student Working in Industrial Electroplating Department.
5. Soil Mechanics Laboratory.



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Junior Prom. The Major Student Event of the Year.

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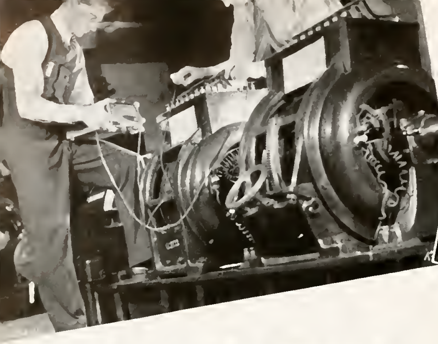
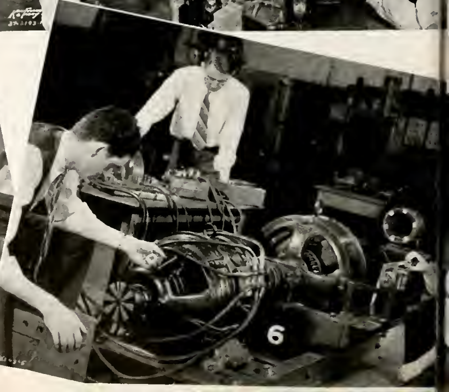
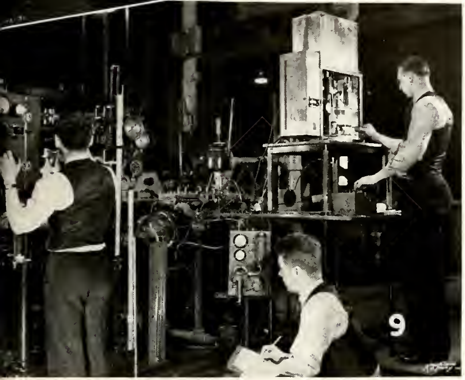


1. Measurements on Sine-Wave Generator.
2. Making Observations in Radio Laboratory.
3. Co-operative Student Calibrating Meter.
4. Television Laboratory.
5. Student Making Electrical Measurements.
6. Testing Induction Motor in Dynamo Laboratory.





7. Experiment in Hydraulic Laboratory.
8. Taking Indicator Cards on Engine in School Power Plant.
9. Testing Gasoine Engine in Automotive Laboratory.
10. Making Observations on Diesel Engine.
11. Experiment in Air Conditioning.
12. Test on Air Compressor in Mechanical Laboratory.

DR. POULTER AWARDED GEOGRAPHIC MEDAL

Left to right: La Gorce, Grosvenor, Poulter, and Byrd.

BEFORE a gathering of the nation's distinguished scientists, Dr. Thomas C. Poulter, Director of the Research Foundation of Armour Institute of Technology, was awarded a special gold medal by the National Geographic Society at a ceremony in Washington last month, in recognition of his work with the second Byrd Antarctic Expedition.

The presentation was made by Dr. Gilbert Grosvenor, president of the society, in the presence of Rear Admiral Richard E. Byrd and a group of trustees and officers of the society, ranking officers of the Army, Navy, and Marine Corps, scientists and officials.

Dr. Poulter was second in command of the expedition of 1933-35 and, in the words of Dr. Grosvenor, is "one of the foremost scientists and most courageous and competent explorers of America." His efforts in Antarctica, Dr. Grosvenor said, resulted in "outstanding discoveries in many fields of investigation in the physical sciences."

Dr. Grosvenor also referred to the spectacular 123 mile tractor journey made by Dr. Poulter and two companions to the bleak outpost where Admiral Byrd, alone, had lain for two months, rendered helpless by carbon monoxide poisoning. The trip, made in the darkness of the Antarctic winter, was called by Dr. Grosvenor "one of the most dramatic incidents of the Byrd Expedition."

Inscribed on the medal are the words:

SPECIAL GOLD MEDAL

Awarded to Thomas C. Poulter in recognition of his important explorations and achievements and his technical researches as second in command of the Byrd Antarctic Expedition of 1933-1935.

The reverse of the medal bears the seal of the National Geographic Society.

Commander Byrd, who made the trip to Washington especially to attend the presentation, testified that without Dr. Poulter's aid the expedition would have been impossible.

Following the ceremony Dr. Poulter went to New York where he discussed the future of the Armour Institute Research Foundation with a number of men interested in the furtherance of research projects.

Dr. Poulter, well known as a physicist and chemist, had done important research work before the Byrd Expedition. With the expedition his scientific work included geophysical investigations, studies of ice conditions and movement, the making of magnetic soundings, and observations of meteors and auroral phenomena. As senior scientist he correlated the work of other scientists in many fields. He was in command of personnel and operations at the expedition base.

Dr. Poulter now holds the rank of Lieutenant-Commander, U. S. N. R.

INDUSTRY

(From page 15)

casting factory also has arrived at a state where it can tack "largest" to its designation, the 400,000 metal parts it perfects daily putting it head and shoulders above any other concern of the kind in the world.

Plumbing Supplies

On May 1, 1855, there arrived in Chicago a resolute young man of 23, whose name, in the course of the next five decades, was to become familiar to millions of people all over the civilized world—R. T. Crane, founder of the worldwide plumbing supply business that still bears his name.

Seeking out an uncle whom he hardly remembered, this self-reliant newcomer to Chicago told his story and voiced his ambition to capitalize the hard-earned experience of his teens by engaging in the foundry business.

Here seventy-four years ago the earnest young man from New Jersey poured the first metal that ever entered into a Crane product. Simple, compared with the more than 30,000 items of Crane merchandise listed today.

Step by step, the heights of success were approached, until now Crane company stands an international producing and distributing organization.

The original Crane factory before the civil war numbered a staff of four —R. T. Crane, his brother Charles, and two workmen from Brooklyn. The Crane factories today employ more than 15,000, with Chicago still occupying the major position.

Hardware

While the wholesale hardware firm of Hibbard, Spencer, Bartlett & Co. might seem to have little part in a story of the city's industries, the impetus it has given to many local manufacturers in making their wares every-day features in the lives of the American consumer would seem to merit some recognition.

Organized as a partnership on South Water street in 1855, practically wiped out by fire first in 1857 and again in the great conflagration of 1871, it then staged a splendid come-back in 1872 that led to a move to impressive quarters on Lake street. Moving, in 1903, into what was then one of the city's skyscrapers, an eleven-story plant on the river front on State street, and in 1924 to the establishment of its present thirteen-story home at the lake front just north of the river, where more than a million square feet of floor space form one of the great clearance centers for Chicago-made products, the company

(Turn to page 54)

ALUMNI NOTES

The alumni notes columns were not included in this issue of the Armour Engineer and Alumnus because of our special Chicago Charter Centennial souvenir issue. May we take this opportunity of urging you to fill in the information requested on the return post card bound in the March issue and to return it to the Alumni secretary so that complete and up-to-date information may be available for the October issue.

Dues and Life Memberships

We also urge you to give us your support by the payment of your dues or the purchase of a life membership in the Alumni Association. You will find a form for this purpose in the March issue, or you may send in your dues at the rate of one dollar per year. Forty dollars, payable at one time or quarterly, as you may choose, will take care of a life membership. The following have purchased a life membership since March.

BAUR, ROY E.	E.E. '27
CARROLL, EMIL J.	E.E. '05
CORMAN, ABRAHAM A.	F.P.E. '17
HEITNER, WALTER O.	E.E. '11
HOFFMAN, WILLIAM C.	M.E. '33
JENS, ARTHUR H.	F.P.E. '31
KOCH, ALBERT A.	C.E. '32
LEVIN, MARVIN R. R.	E.E. '23
MERRY, EARL D.	E.E. '03
PIPER, ELLSWORTH E.	IND. ARTS '12
PRICE, MYRON H.	EX CH.E. '23
SIEBENALER, GEORGE N.	M.E. '16
VON GEHR, GEORGE H.	E.E. '28

Alumni Directory

The plans for an alumni directory are still in process and your cooperation is necessary in order that the directory may become a reality. We want the return post cards from about one half of the Alumni Association, so please do your bit and send along the information as to home and business addresses, business connection, and telephone numbers.

On the job during the summer, we extend to each of you an invitation to visit the school. You will be surprised and pleased to see the changes.

D. P. Moreton, Alumni Secretary

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F. M. de Beers, Ch.E., A. I. T., '05

has kept pace with Chicago's other key institutions in every respect.

The Oil Industry

Oil and gasoline have also done their part in recent years to bring new growth to Chicago industry. Stretching out along the city's southern borders and repeated again at Lockport, on the southwest corner of the Metropolitan area are the great refineries of several of the best known oil producers in the country. Pipe lines bringing the raw product from wells hundreds of miles away, and tankers operating the Great Lakes and the Illinois waterway system tie these great power centers to well digger and consumer. The Standard Oil Company of Indiana, the Sinclair Refining Company, the Texas Company, and the Shell interests are but a few of the internationally known concerns that form part of Chicago's new petroleum aristocracy.

Communications Field

Other new scientific developments of the past decade that have added to Chicago's factory payrolls are the products of the communications field. Radio has built the great factories of the Zenith Radio corporation, and a dozen or more busy contemporaries; while in wired communication the best results of inventive genius are to be seen at the plant of the Teletype corporation, where new equipment revolutionizing intercity and interoffice contact has been brought forth in rapidly growing quantity to give better cohesion to the country's far flung financial markets, its widespread newspaper network, and scores of other enterprises where speed and accuracy in transmission of information are fundamental.

Building Materials

The economic recovery of the past eighteen months has brought back to the fore other industries that have figured prominently in Chicago's commercial ascendancy. Back out of the doldrums of the depression have come such companies as the Illinois Brick company and the Universal Atlas Cement company, both resuming their old importance as the building industry has started its comeback; while in other sections of Chicago, notably in its manufacturing sections and centers of activity such as the Clearing and Central Manufacturing districts, bigger payrolls, reawakened machines and punch presses, and constantly growing lines of merchandise, laden freight trains and motor carriers again bespeak Chicago's rightful claims to recognition as America's true center of industry.

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Instantaneous Direct Reading

No longer is it necessary to use complicated instruments and stop watches or make slow, mathematical calculations to obtain accurate velocity readings of irregular shaped or slotted grilles, velocity readings in ducts, or at inlet or outlet openings or other air velocity measurements.

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The Velometer gives instant air velocity readings directly in feet per minute from as low as 20 F.P.M. up to its maximum scale reading. Ranges up to as high as 6000 F.P.M. are available.

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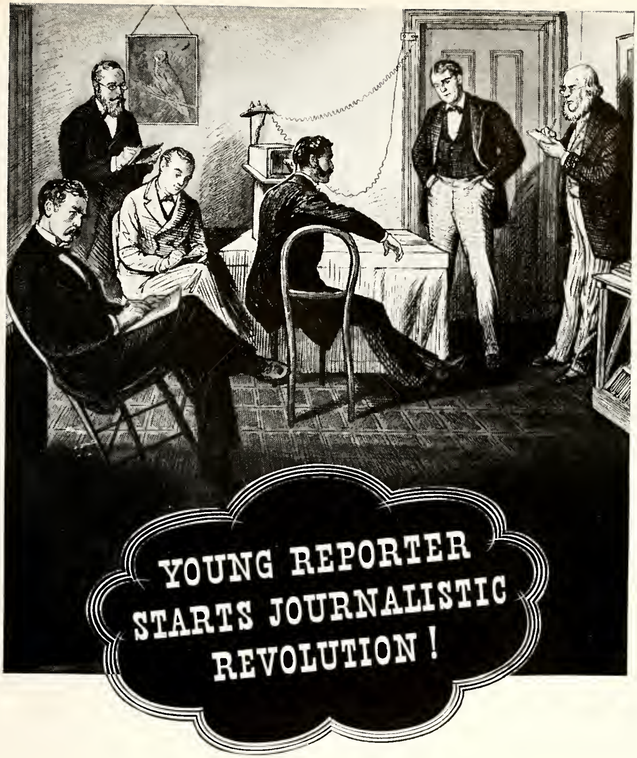

YOUNG REPORTER STARTS JOURNALISTIC REVOLUTION!

It happened in Salem, Mass., on February 12, 1877. The young reporter attended a demonstration of inventor Bell's new telephone—then "talked" his story to his paper in Boston *by telephone!*

Though he didn't realize it, he was inaugurating a new era in journalism. For today's newspapers could hardly exist without the telephone.

Gathering and spreading news with lightning speed is just one of the telephone's countless contributions to modern life. And 300,000 Bell System people strive constantly to make the service still better, still more useful.

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RECREATION

(From page 22)

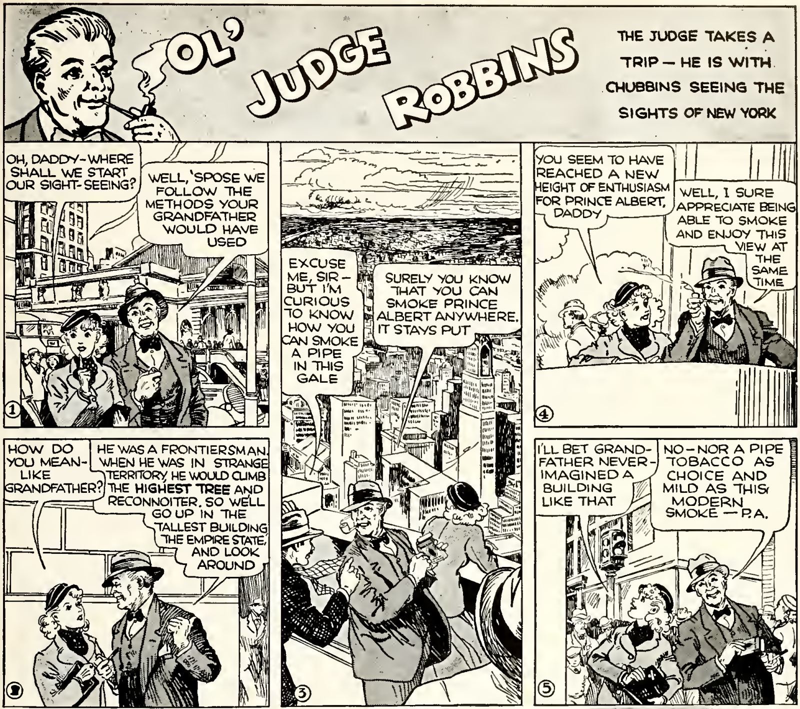
of Chicago built a Municipal Pier, combining recreational provision and commercial dockage possibilities, extending one-half mile out into the Lake itself at the north side of the River. The ambitious south side development project has built only the first of a projected series of islands, to extend six miles southward from the city's center. But the work of reclaiming the lake shore goes on, with filling operations succeeded by leveling and dressing the surface with black earth, the building of roads and pleasure grounds, and the planting of growing trees and shrubbery, to beautify the new made lands. Nearing completion is the Outer Drive Bridge, spanning the Chicago River mouth, and connecting the north side with the south side shore development. This summer will see this vital link completed.

The Highway System

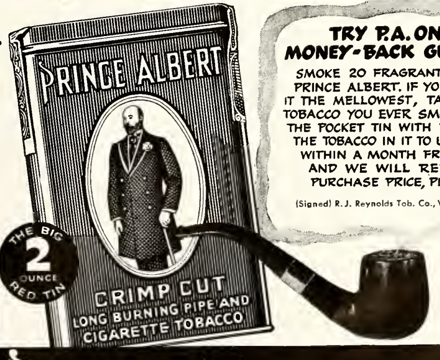
A great deal of attention has been given to safety of traffic in the shore highway, and a variety of grade separation and other safety features characterizes this highway's development. This shore highway, however, is only one of the net work of boulevards for pleasure cars servicing the motorist in all parts of the city. The city itself, without regard to expense, has cut through built-up areas, a great system of highway widening for business and commercial traffic, radiating arteries cutting diagonally into the heart of the city, great roadways leading into Chicago from all directions, —all are a related part, with the boulevards themselves, of a comprehensive highway system, continuously being further elaborated in conformity with the city plan originated by Daniel Burnham and continued as a blue print and prospectus of the city's growth.

Facilities, however, are not of themselves an answer to a city's recreational needs. There are two other essentials: Such freedom of action as permits the citizens to enjoy those facilities with a feeling of proprietorship, developing into a habit of making the most of what is given them; and an operating staff which is professionally competent, both to inspire and to aid such use.

Both public and private agencies in Chicago have developed standards of professional service which contribute vitally to the usefulness of the institutions employing them. The millions frequenting the beaches during the summer are safeguarded by a life guard staff, every man of whom has


OL' JUDGE ROBBINS
THE JUDGE TAKES A TRIP — HE IS WITH CHUBBINS SEEING THE SIGHTS OF NEW YORK
1
OH, DADDY-WHERE SHALL WE START OUR SIGHT-SEEING?
WELL, 'SPOSE WE FOLLOW THE METHODS YOUR GRANDFATHER WOULD HAVE USED
2
HOW DO YOU MEAN-LIKE GRANDFATHER?
HE WAS A FRONTIERSMAN. WHEN HE WAS IN STRANGE TERRITORY, HE WOULD CLIMB THE HIGHEST TREE AND RECONNOITER. SO WE'LL GO UP IN THE TALLEST BUILDING THE EMPIRE STATE, AND LOOK AROUND
3
EXCUSE ME, SIR — BUT I'M CURIOUS TO KNOW HOW YOU CAN SMOKE A PIPE IN THIS GALE
SURELY YOU KNOW THAT YOU CAN SMOKE PRINCE ALBERT ANYWHERE. IT STAYS PUT
4
YOU SEEM TO HAVE REACHED A NEW HEIGHT OF ENTHUSIASM FOR PRINCE ALBERT, DADDY
WELL, I SURE APPRECIATE BEING ABLE TO SMOKE AND ENJOY THIS VIEW AT THE SAME TIME
5
I'LL BET GRANDFATHER NEVER IMAGINED A BUILDING LIKE THAT
NO — NOR A PIPE TOBACCO AS CHOICE AND MILD AS THIS MODERN SMOKE — P.A.

"THAT PRINCE ALBERT 'CRIMP CUT' CERTAINLY PACKS AND DRAWS TO PERFECTION"


PRINCE ALBERT
THE BIG 2 OUNCE RED TIN
CRIMP CUT
LONG BURNING PIPE AND CIGARETTE TOBACCO

TRY P.A. ON THIS MONEY-BACK GUARANTEE!

SMOKE 20 FRAGRANT PIPEFULS OF PRINCE ALBERT. IF YOU DON'T FIND IT THE MELLOWEST, TASTIEST PIPE TOBACCO YOU EVER SMOKED, RETURN THE POCKET TIN WITH THE REST OF THE TOBACCO IN IT TO US AT ANY TIME WITHIN A MONTH FROM THIS DATE, AND WE WILL REFUND FULL PURCHASE PRICE, PLUS POSTAGE.

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undergone rigorous pre-season training, and has proved proficiency by actual tests of an exacting nature in the water, in boats, and ashore, in all of the requirements of his position. Every sport is competently taught and officiated, and the numerous clubs in dramatics, in music, in art, the applied arts, or mechanical crafts, have leadership professionally trained and experienced, directing and supervising the activity. Uninspired, a playground may readily enough become a "recreational slum," in the words of a recent editorial in one of our newspapers. Group workers motivate the activities of all of the numerous social agencies; and city, school, and park playgrounds are equipped with leadership not only originally competent, but continuously, through conference and institute sessions, kept abreast of the rapidly developing new trends in modern recreation.

Carnivals of Sport

No list of Chicago's recreational advantages is complete unless it mentions some of the carnivals of sport which have become traditional in the city. The metropolitan newspapers have each its own program of promotions, numbering tens of thousands in the roster of participants in a year-round series of great sports events. The Music Festival of the Chicago Tribune, staged in Soldier Field Stadium annually, fills the structure with a hundred thousand or more as audience, presenting the music of voice and instrument representing the best not in Chicago alone, but in the surrounding states as well. Private initiative contributes also to the cultural attractions of the city,—the Art Institute, with its frequent exhibitions of contemporary art; the great series of nightly orchestra and band concerts provided jointly by the Park District and the Federation of Musicians; numerous groups engaged in Little Theatre dramatic productions,—the Loyola University Players, the Jewish People's Institute, and the Hull House Players, and others too numerous to mention, presenting in the Goodman Theatre the art of the people themselves as expressed in drama. The Chicago Symphony and the Chicago Civic Opera need no words of introduction anywhere, and in the field of sports the local universities, as well as the professional exhibitions, minister to millions of spectators throughout the years.

Spare time need not hang heavy, as a dull and uninteresting part of life in Chicago. Rather, leisure is interpreting itself here as opportunity to go adventuring in search of new accomplishments, new friendships, or new interests, contributing to the zests of living, and contributing also to its neighborliness and its richness in association with one's fellows.

If a man empties his purse into his head, no man can take it away from him.

An investment in KNOWLEDGE always pays the BEST INTEREST.
—Franklin.

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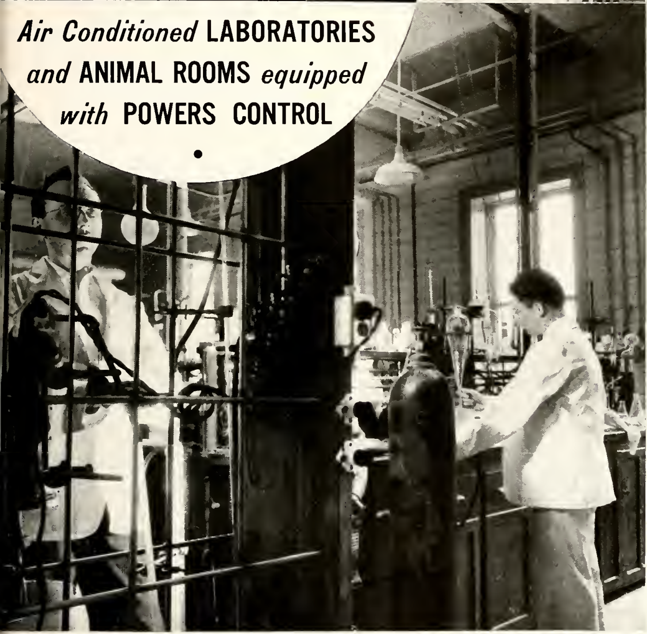

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SOY BEAN LABORATORY University of Illinois, Urbana, Ill.
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U. S. DEPT. OF AGRICULTURE, Various Laboratories, Washington, D.C.
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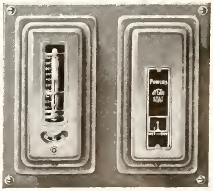

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MUSIC

(From page 30)

solicited and used for the building of a home of the orchestra's own and Orchestra hall (or Theodore Thomas Orchestra Hall, as its portal reads) was finally ready for occupancy, Thomas was at the end of his life. He died Jan. 4, 1905, to be succeeded by his assistant, still in office, Frederick A. Stock. Thomas had been musical director of the Columbian Exposition, but resigned early in August, 1893, to be succeeded by Max Bendix.

The "Golden Age" of Opera in Chicago

Operatic performances continued to be given in seasons more or less brief. It was the great era of brilliant vocalists known as the "Golden Age" of opera in America. Chicago heard all the bearers of great names, but it had already made the acquaintance of prima donnas and their temperaments as early as 1879, when the Mapleson opera company, boasting Etelka Gerster as one of its sopranos, gave her on the opening night in Chicago a dressing-room thereafter known as "the prima donna's room." On the second night of the engagement, two other ladies, rejoicing in the prospect of a room so designated, vied with each other, the strife having begun in the afternoon and consisting of alternate ejection of the other's belongings. Mmes. Roze and Hauk, both cast for "Marriage of Figaro," prolonged the battle for two hours after the performance was scheduled to begin, and Minnie Hauk (an American, at that,) was finally persuaded to return from her hotel and join in a performance already under way.

Years later, Fremstad and Gadski, singing in "Tannhauser," were to have a notorious difference of opinion. And prior to that, perhaps, had occurred the famous performance of "Magic Flute," in which Sembrich, annoyed at the brilliant success Fritzi Scheff had made by charmingly clowning a comic role, absented herself from the theater until due mollification had been administered in the tactful manner acquired only by those who know the prima donna temperament, its strength and—its weaknesses. Lucien Muratore's famous quarrel with Mary Garden was to come much later, when Chicago had an opera company of its own.

Chicago Civic Opera

For a number of seasons prior to November 3, 1910, the Metropolitan Opera of New York city had been giving spring seasons here of from two to four weeks. On the break-up of Oscar Hammerstein's Manhattan Opera company in the same city, lo-

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cal interests were invited to revive the organization for Chicago, and this was accomplished under the chief benefaction of Harold McCormick and the late Edith Rockefeller McCormick. The most important musical director during the first period of Chicago Opera was Cleofonte Campanini. After his death and the partial but decisive withdrawing of the McCormick's subvention, there was a tentative reorganization, in which Garden emerged as directress for a brief but brilliant year, when the Chicago Civic Opera was formed with Samuel Insull as director. This company failed with the depression, and its reorganization, after several years' lapse, has been a matter of gradual and in some respects painful recovery. Under Mr. Insull a new opera house was conceived and built within the office building at 20 north Wacker drive. During the period of Chicago's own opera at the Auditorium there developed a unique institution, owned and directed by the late Louis Eckstein, in which opera was produced under shelter but in the open air, from the end of June until Labor Day.

With the depression musical activity was crippled seriously, and its resumption has been uncertain in direction. Just as the phonograph was once feared as a rival to actual musical performance (though in the end the gramaphone was forced to take account of the best in music), so radio has now most seriously complicated the actual commerce of music, except as radio performances themselves are concerned. What this new element will have of influence within the profession of music remains uncertain; but it also has availed itself of the finest that can be found in music and in musical performers.

The Future of Music in Chicago

The future of Chicago as a musical center remains in question and depends upon conditions throughout the country. It has supported, though not lavishly, a symphony orchestra, now in its forty-sixth year. It has enjoyed, lost, and is seeking to regain an opera company that private individuals have underwritten. It is eager yet somehow indolent, though tremendously loyal, as a musical public. It is one of the greatest centers of musical education in the world, so far as numbers are concerned: it has about 60,000 music students resident here. It is still a pioneer city, relaxed, as a second generation, or a third, generally is; for a city's generations are slower than a family's. Chicago is young, but being young, it is still both a bit musclebound and intellectually flabby. It has pro-

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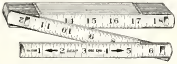

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duced some great artists, and it has heard countless great artists. The city is not so important in music commercially as is New York, where the musical trades are centered; but its taste is more representative of the nation than is New York's, and no artist whom Chicago has ever enjoyed ever forgets our city.

SEVEN WONDERS

(From page 28)

of vanished times; and if ghosts walk, one is certain they feel at home.

The Brookfield Zoological Gardens

With an eye to making even the animals feel at ease, Chicago has spread a zoo in Brookfield near Riverside at a cost of $4,000,000. Like the landed estate of some fifteenth century Italian squire, the 196-acre park is bordered with shrubbery, trees, and a sturdy fence. White groups of farmlike buildings cluster informally in the center, and an artificial lake makes a natural habitat for many birds and fish.

At first entrance to the gardens it appears that man-eating animals roam at will without precaution of bars. On the side from which the visitors view the lions or tigers, however, empty or water-filled moats form intervening barriers. Unscalable rock work is used as a background. At the present time the zoo contains the world's largest collection of mammals, birds, reptiles, amphibians, and fish. An invertebrate house has been constructed. The design of the park was drawn by Edwin H. Clarke after an extensive tour of Europe and America. The zoo itself is directed by Edward H. Bean, former head of the Milwaukee zoo.

Museum of Science and Industry

The ancients are really undone when it comes to Chicago's seventh wonder, the Rosenwald Museum of Science and Industry, at Jackson park. From an architectural point of view, this Ionic building rivals the Parthenon and is known among builders to be one of the most symmetrical edifices in the world. The permanent reconstruction of the museum, which was erected temporarily in plastered brick for the old Columbian Exposition, has averted an artistic tragedy. It is a fitting comment on present civilization that this dream in stone houses a museum of whirling wheels, X-ray machines, locomotives, and crackling wireless apparatus.

Endowed by Julius Rosenwald and reconstructed at a cost of $8,000,000, it was opened formally in 1931 with only a portion completed. When entirely finished, the museum will cover 600,000 square feet of floor space and six acres of ground, resulting in the world's largest exhibition center. It is divided into a theater, lecture halls, exhibit rooms, offices, library, and dining rooms.

Most of the apparatus on display can be worked by the spectator. The entire collection covers the geology and mineral industries; agriculture; power; land, water, and air transportation; printing and communication; and forestry. The Museum of Science and Industry is another step in the all-embracing cultural plan of our city.

Chicago will always carry a chip on its shoulder. Successful as an industrial center it was not satisfied until it, too, was one of the greatest cultural meccas in the world. All this is said in its motto "I Will." Unlike the ancients, however, who picked the Seven Wonders of the World, and mused about their bewildering beauty for centuries, Chicago does not wonder about its seven wonders. It has not time to stop. There are more to be added.

AIMS AND ACTIVITIES

(From page 41)

through advanced work, the Graduate Division of the Institute has been recently established. A full program leading to the master's degree is already available in both College and Evening Division. It is expected that an increase in research personnel will result in rapidly enlarging the scope of graduate study in the several departments.

During the current year the Institute has enjoyed the largest enrollment in its history in both the College and in the Evening Division. Numerous additions have been made to the faculty and staff, and in many of these cases men of wide reputation have been appointed. The educational objectives now definitely established include an undergraduate college of enginering and architecture of first rank; a distinguished Graduate Division; the Research Foundation to carry on a continuing program of fundamental research, as well as of a program of research for industry; and the Evening Division to provide instruction for adult students of the community in part-time courses in the field of engineering and architecture.

The Board of Trustees, the Administration, and the Faculty are continually striving to provide the Institute with unexcelled facilities for carrying out this program. Substantial progress has been made toward these objectives, and there is every reason to believe that even more rapid developments will take place in the near future.

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ART

(From page 25)

in the two great exhibits in connection with the Century of Progress of 1933 and 1934. The first of these exhibitions—stressing "a Century of Progress" in American collecting—drew over a million and a half visitors. In 1888 there began a series of annual American exhibitions — the Forty-Seventh of which was held last autumn. To go through the catalogues of these exhibits is to realize that most of the greatest American paintings and sculpture produced during this period have been on view in Chicago. In fact the tradition of changing exhibitions as one means of animating a museum is so strong in Chicago that the Art Institute yearly arranges more showings of art than any other similar institution. Departments draw upon reserve materials; in the Print Galleries for example there is a constantly rotating exhibit of etchings, engravings, and lithographs drawn from a permanent collection of over 17,000 items.

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these works of art meaningful to the interested public. From a few hundred members in 1879, the membership has expanded to over 14,500. Members attend lectures, gallery talks, and previews of exhibitions. They learn about interior decoration in special demonstrations given on period and modern styles. In large numbers they draw in the amateur sketch classes. Their children visit the collections on special gallery tours where the history they are learning in school comes alive in terms of some painting from the period of the Medici or a room from seventeenth-century Holland. They paint and sketch in the children's classes and see how to make a woodcut or a batik from practical demonstration. The larger public, meanwhile, comes to the museum to see the transient exhibitions and to hear open lectures. Loan exhibits like that of Rembrandt and his Circle, or the paintings of Van Gogh bring out extraordinary crowds and indicate that outside the regular attendance of over a million a year there is a vast, untapped audience eager to come in contact with art as experience.

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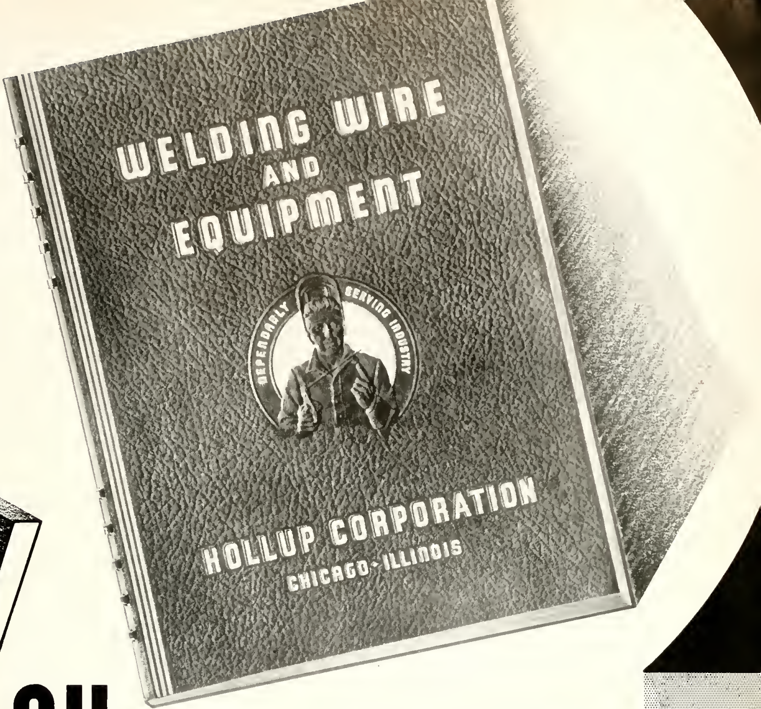

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EDUCATION

(From page 33)

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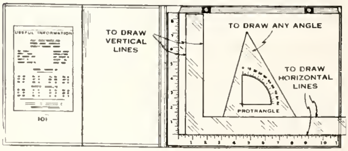

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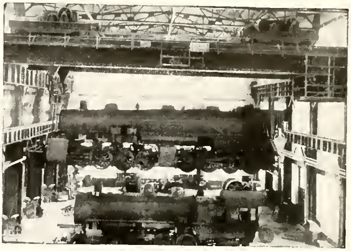

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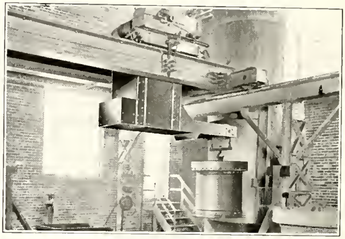

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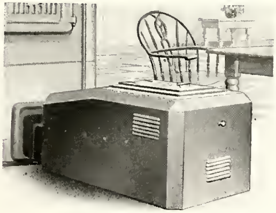

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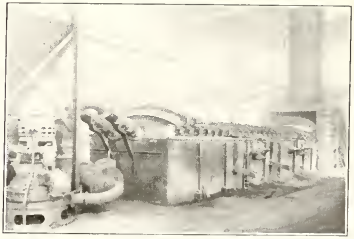

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HISTORICAL SKETCH OF ARMOUR INSTITUTE OF TECHNOLOGY

(From page 40)

dress; for the first commencement of the academy, Rabbi E. G. Hirsch.

Having reviewed at some length the early history of the Institute, we must hurry on through the years, selecting only such events as seem significant.

From time to time the Institute had undertaken new courses which, subsequently, it had had to drop. One such was mining engineering, given up after the first year for lack of facilities. Surprising to many will be the news that once, fully equipped, the Institute planned to give premedical instruction. It also announced a course in telephone engineering; and, later, a four-year course in industrial arts, which for some years it continued to give. But through it all we see a continuity, a clear purpose, a hewing to the line.

The important, permanent additions were civil engineering in 1899; chemical engineering in 1901; and fire protection engineering, the only course of its kind in the country, in 1903.

Back in 1896, when Mr. Armour was asked by an enterprising reporter what he thought of his Institute, then only three years old, he replied, "Armour Institute is the outgrowth of an experience in trying to help young people at Armour Mission. It is a most satisfying experiment. . ." How much clearer this appeared at the turn of the century!

P. D. Armour Dies

The year 1901 was a most important one. Dr. Gunsaulus had resigned the presidency during the previous summer because of ill health; and the school was in the hands of an acting-president, Professor V. C. Alderson.

Philip D. Armour, likewise, had been ill, suffering from heart trouble; and on January 6, at the age of 68, he passed away. One of the first citizens of the city, and a merchant known all over the world, his death was of national importance. Among the honorary pallbearers were Cyrus McCormick and Marshall Field; among the active pallbearers, Valen-

(Turn to page 72)

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tine, Meeker, Simpson, Wilson, all men of industry; among those who attended the private service at his home, Mayor Harrison, Gustavus Swift.

Through a raging snowstorm came thousands to view him lying in state in the Mission, this Mission of which he was so much a part, and in which a brief and simple service was now being said for him before he was placed on the waiting special train and taken to Graceland cemetery. Across the street stood the school he founded, the thing in life he loved most dearly, which represented the growth of his own intellectual life, and the best investment he ever made. The amount of the investment in Mission and Institute was said to be nearly three million dollars.

Million Dollar Gift

Three months later, Mrs. Philip D. Armour and her son, J. Ogden Armour (Philip D. Armour, Jr., had died in 1900), added another million dollars to that investment, and urged Dr. Gunsaulus to resume his presidency, after an absence of eight months, and to assist in planning an even larger school.

It was in celebration of this gift that some sixty night-shirted students were arrested for refusing to pay fares and trying to take over some of the rolling stock of the South Side Elevated Company. Early the next morning acting-president Alderson and comptroller F. U. Smith, having forgotten their wallets and receiving no response from J. Ogden Armour who was out of town, borrowed the necessary cash bail, it is reported, from one John Rafferty (a saloon keeper,—whom they did not know), and scheduled their property to guarantee the appearance of "Terry McGovern", "James A. Herne,", and the other aliases.

The trial was everything but decorous. Adorned with neckties made of pieces of nightshirt and supported morally by the presence of other students, male and female, they assisted justice by interrupting the testimony with exceptions and greeting the remarks of the honorable Judge Prindiville "with cheers, catcalls, shrill whistles, and college yells." Discharged on kindly recommendation of the attorney for the railroad, the boys walked back to school, scorning to ride in cars of the company that had arrested them, thus evening the score, so they thought.

When it was announced a few days later that Mr. J. O. Armour would pay the $135 fine, the students were in favor of starting another celebra-

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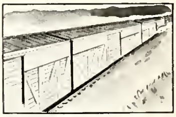

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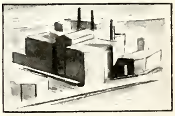

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tion in appreciation. But Mr. Armour, while excusing the one outburst, made certain important declarations: first, that he would pay no more fines; and second, that if the students got into trouble again they would have to get out of it themselves.

Upon meeting trustee and former president Gunsaulus on the street and casually informing him of the million dollar gift, J. Ogden Armour said to him, "I just wanted to tell you that I consider the west to offer a great field for work in engineering and technology and that I want Armour Institute to be one of the leading schools of technology in the world." Dr. Gunsaulus went even further in his reply. "This gift," he said, "will allow the school to branch out and take its place as the greatest technological school in the world." The *Tribune*, commenting on the plan for an enlarged school, said, "with such an institution supplementing the two universities, the museums, academies, and libraries of Chicago, the educational opportunities afforded by this city would be very nearly complete."

End of Co-education

Second in importance to the announcement made at commencement in 1901 of the return of Dr. Gunsaulus to the presidency, was that of the termination of the course in domestic science. The reason for this decision was obvious. When the Institute was founded its purpose was not definite, and the school had to find its own field by experiment. Now it had reached the conclusion that by concentrating its energies upon technological branches it could accomplish the best results.

Machinery Hall Built

In this same year, 1901, to meet the expanding requirements of the course in mechanical engineering, Machinery Hall was constructed at a cost of over $100,000, a gift of Mrs. P. D. Armour and J. Ogden Armour. This building was ready for use at the opening of school the following year.

It is also of interest to recall that early in the summer of 1901, Lee DeForest, an instructor at Armour Institute, experimented with wireless telegraphy and from his laboratory sent out his first message.

Affiliation with the University of Chicago

In the spring of 1902 rumors of an affiliation began to circulate. All the Chicago newspapers but one ran feature stories and treated the matter as an accomplished fact. The one exception published a denial by Dr. Gunsaulus in which he said that the

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announcement was premature, that the Institute had a more glorious future than ever dreamed of, and that in the event of a consolidation the Institute would never lose its identity. Dr. Gunsaulus was reported to have admitted having had conferences with Dr. Harper and that he thought it would be "a grand thing if the universities could get together on such a proposition."

But nothing developed, and the ghost of the old story was finally buried with the announcement, in 1904, of a large gift of land, by J. Ogden Armour. This tract, worth a quarter of a million, and lying north of the Mission, was to be turned into an athletic field, the lack of which had forced the teams to practice in the American league baseball park at Thirty-ninth street and Wentworth avenue or in the playground of a school nearby.

Correspondence Course

It was about this time that correspondence schools had their vogue. The University of Chicago was advertising "Home Study" and offering 250 elementary and college courses by correspondence in 29 subjects. President Harper, by someone called the founder of this method of instruction, was one of its strongest supporters. Northwestern University, by a tie-up, also entered the field.

Armour Institute of Technology may have preceded it. At any rate, believing that the work of education in technical subjects by means of correspondence could be made efficient and helpful beyond what had hitherto been accomplished, Dr. Gunsaulus made arrangements with the American School of Correspondence, established in Boston, in 1897, and now moving to Chicago, to conduct this work with the assistance of the Institute's faculty.

Besides the instruction it gave, the correspondence course spread the name of Armour Institute of Technology to the uttermost parts of the earth. Students from every country and climate, from the Fiji Islands, Argentine, Korea, Alaska, Moscow, Trinidad, Peru, Australia, and over 300 from New Zealand registered for the courses. The aim was to bring a technical education within the reach of the workingman. After a few years, this affiliation was dissolved, the correspondence school establishing itself elsewhere in its own quarters.

With the addition of civil engineering in 1899, chemical in 1901, and fire protection in 1903, the Institute had rounded out its curriculum and was

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During the decade preceding the World War, there were no exceptional events. It was a period of solid work and substantial achievement. On the entrance of this country into the war, Armour Institute of Technology, as other schools, was turned into a training camp, the widest possible use being made of its technical facilities.

New Site in Windsor Park

Soon after the war, however, plans were formulated for the removal of the Institute from its present location to a new million-dollar site in south Chicago, at 75th street and Yates avenue, and for building a new Institute at a cost of six millions. The new location was adjacent to the steel mills and other industrial plants of the Calumet region and ideal for the study of industry at first hand.

Dr. Gunsaulus, for twelve years pastor of Plymouth Church, from 1887 to 1899, and for twenty years minister of Central Church, was now giving up this latter connection to devote his entire time and energy to the fulfillment of these plans.

In a statement prepared for publication, Dr. Gunsaulus, who was largely responsible for the selection of the new site, gave as his reasons, that it was near the lake, and near the great steel mills and allied industries. In elaboration, he said, "We can't teach marine engineering on the Chicago river or a prairie," and "We must have laboratories costing $100,000,000," signifying the steel mills.

Gunsaulus Dies

In the midst of these plans for the future, Dr. Frank W. Gunsaulus died, on March 17, 1921, at the age of 65. Of his 34 years as a citizen of Chicago, at least 30 had been spent on Armour Institute of Technology, which had become the primary object of his life. He was preeminently a man of action, and a genius for administration. His death occurred at a very critical moment.

Now to Howard Monroe Raymond fell the difficult task of carrying on the work. A member of the faculty since 1895, and dean of engineering from 1903, he took over the duties of the presidency, receiving the permanent appointment in May, 1922. Professor L. C. Monin was made dean in his place.

Merger with Northwestern University

In 1923 the new site was sold, and plans were postponed and finally

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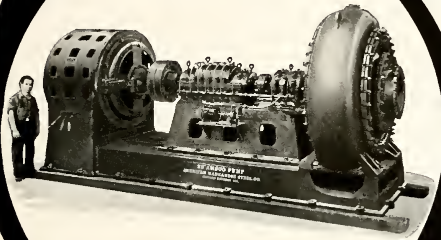

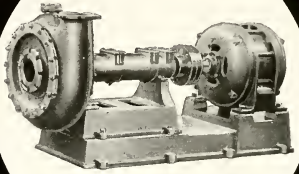

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AMSCO Manganese Steel Pumps are made in all sizes from 3" to 20" for pumping materials of all kinds.

An interesting comparison of capacities, dimensions, etc., of the two AMSCO Manganese Steel Pumps illustrated follow: Small Pump, size 3", nominal capacity 230 g.p.m., solids capacity 7 to 10 yards per hour; height 2'3", length 4', weight with motor 1 ton. Large Pump, size 20", nominal capacity 12,000 g.p.m., solids capacity 360 to 520 yards per hour, height 8'6", length 19'6", weight with motor 40 tons.

AMSCO Pumps feature durability of construction, lasting efficiency, accessibility of all parts, and a much longer service life because all water-end parts are made of manganese steel, the toughest, abrasion-resistant steel known! They are widely used for pumping sand and gravel, and wasting sand in commercial aggregate plants.

Flap Valves, Elbows, Slip Joints, Pipe, Nipples, Reducers, and other manganese steel parts are included in the AMSCO Line of Materials Pumping Equipment.

May we furnish you with operating details on AMSCO Materials Handling Pumps?

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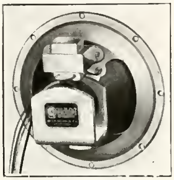

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Of course, this plan had also to be given up. And the Institute had nothing else to do but to remain a separate and distinct school. After all, this was best, and the way it was originally intended when in 1891 the corner stone was laid.

Dr. W. E. Hotchkiss Appointed President

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